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A JOURNAL
OF MANUFACTURING
INDUSTRY

THE *Inventive Age* AND PATENT INDEX.

AND SCIENTIFIC PROGRESS.

Fourteenth Year. }
No. 1.

WASHINGTON, D. C.---JANUARY, 1902.

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One Dollar a Year.

✧ THE VANDERBILT BOILER ✧
AN EPOCH-MAKING INVENTION.

WITHOUT doubt, the locomotive of to-day is one of the most wonderful machines in existence. It is the result of the thought and study of many inventors, and has grown gradually, but steadily, from the little "Rocket" of Stephenson, to the enormous racers that whirl the modern traveler across the country at the rate of more than a mile a minute, and the slower, but more powerful, iron draft horses that haul the trains of a hundred loaded cars from place to place.

The growth of the locomotive has been one of necessity. As traffic and the amount of material to be transported became greater, larger trains became necessary, and greater tractive power was needed. These more unwieldy forces furthermore had to be controlled, and the result is the modern locomotive of almost

immeasurable power, and yet under the complete mastery of a human hand. Still the locomotive is far from being a perfect piece of mechanism. Inventors are still striving to cheapen its construction and overcome its wastefulness, and there is a broad field for such work.

One of the greatest improvements recently made is due to the genius and careful study of Cornelius Vanderbilt. In the November 1899 number of the INVENTIVE AGE, there appeared a short

description of the improvement, which relates to the construction and arrangement of the fire box, and since then numerous articles have been printed in various periodicals concerning the same. Many people rather ridiculed the importance of the improvement, and even after it was announced that several locomotives were to be built in accordance with the same, the public generally, thought it was due to the force of the inventor's name and family rather than to the merit of his invention.

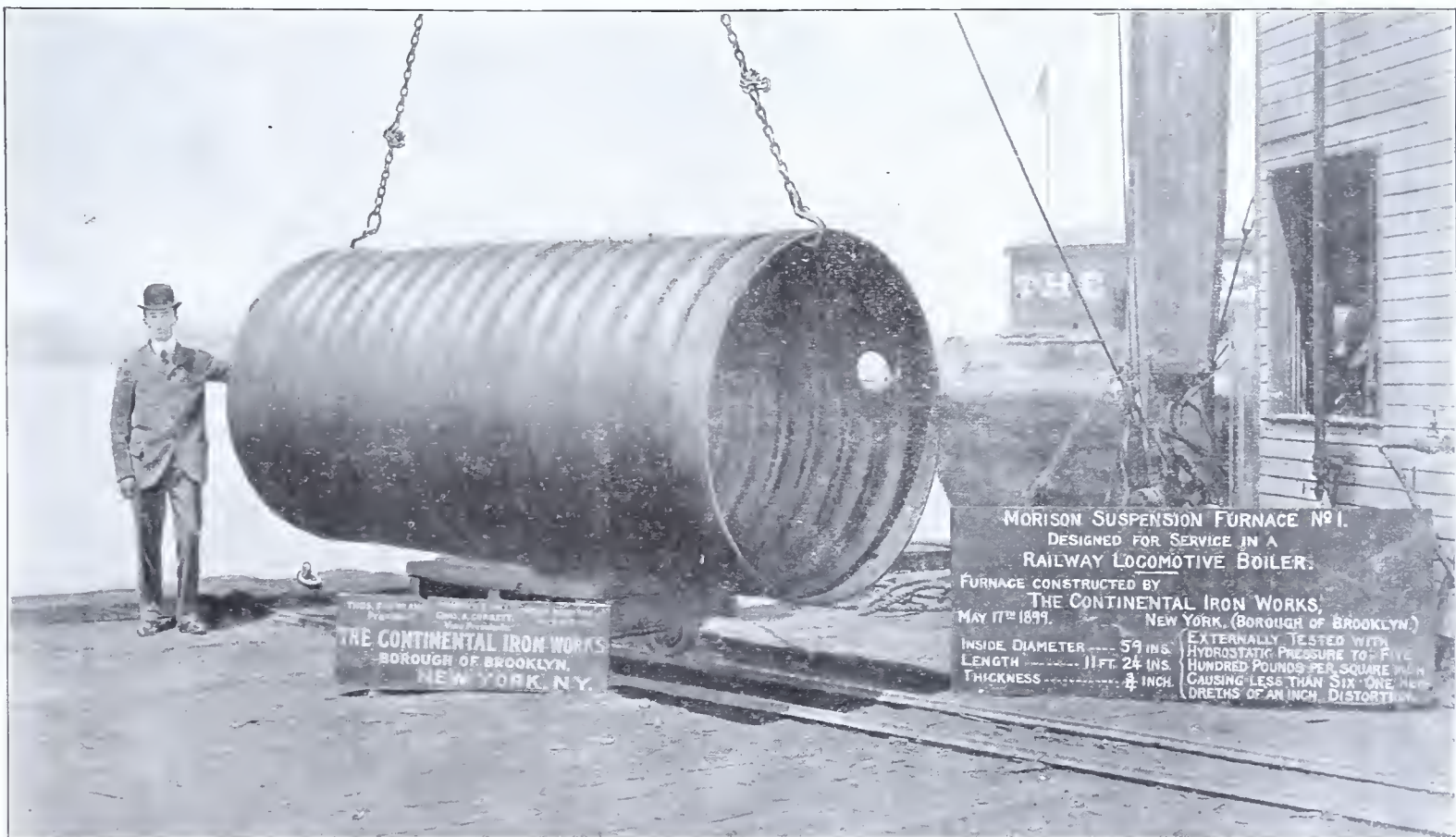
It is through the courtesy of the Baldwin Locomotive Works, that we are able to publish the following data, which shows that Mr. Vanderbilt is not

only a deep thinker and thoroughly understood the need of his improvement, but that he is an inventor fully qualified to take rank with those famous in the history of this country.

Among the many elements making up a locomotive, it is safe to say that the boiler has changed less since its inception than any other equally important part, for in looking back at its history we find after the first few locomotives, a general type of boiler adopted which has been followed, with but few variations, up to the present time. It is difficult to say exactly why this has been the case, even making allowance for the peculiar conditions which limit such designs, as the few developments and improvements which have come, have followed such very narrow lines, that it would almost seem as though there must be some insuperable difficulties in the way of any progress in this direction; that is to say, the majority of the attempts to improve have taken the form of different arrangements for staying a flatsided fire box or a partially curved crown, as but few have attempted to alter certain well-established shapes for the fireboxes themselves.

The first locomotive proper which came into use was Richard Trevithick's engine, in 1804, the boiler of which had a cylindrical cast iron shell with a wrought iron internal cylindrical return flue. It is obvious that no large

amount of heating surface can be obtained in any such design, and therefore, but few improvements in boilers were made until the Multitubular system was introduced. This was adopted by Stephenson, in the boiler of the "Rocket" locomotive, designed and built by him in 1829. The front portion of the boiler through which the tubes ran, was cylindrical and 3 feet 4 inches in diameter; the tubes were 6 feet long and 3 inches outside diameter, the fire-box was rectangular, projecting be-



CORRUGATED FIRE-BOX FOR VANDERBILT BOILER.

hind the rear end of the cylindrical portion of the boiler and was 3 feet wide and 2 feet long; it was surrounded on three sides and on the top by a water-leg 3 inches wide.

The Multitubular system is so largely the basis of every modern locomotive boiler outside of the firebox section, that it is interesting to note its origin. In 1826, a Mr. Neville took out the English patent for a vertical tubular boiler, which stated that the system was equally applicable to horizontal boilers. It would therefore seem as though we owe this portion of the modern design to the vertical land boiler, but this, however, is not entirely undisputed, as the

idea is often credited to a Mr. Booth of the Liverpool and Manchester Railway. Mr. Stephenson improved his original "Rocket" boiler in 1833, by projecting the cylindrical portion of the shell over the firebox, which of course allowed a much larger steam space and much greater disengaging surface. This modification of his original design has been the basis on which practically all subsequent locomotive boilers have been modeled.

The pressures carried at this time were so low that it was not necessary to stay the flat surfaces which appeared in the approximately rectangular fireboxes, but when the pressures were increased, and it became impossible to leave these flat surfaces unsupported, some method of preventing the collapse of the firebox and the bulging and ultimate explosion of the shell had to be devised; and the crown bars and the staybolts therefore came into use. It is strange that no attempts were made to use some form of firebox which would not require support.

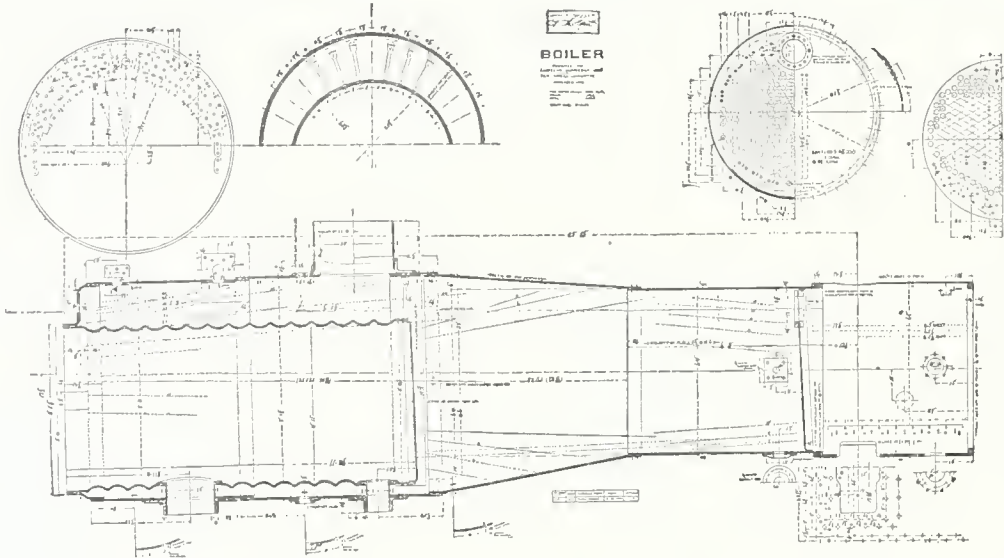
In some of the larger boilers in use at present, anywhere from 1400 to 2000 staybolts are required for the support of the firebox and the outer shell surrounding it, and any one at all familiar with the maintenance of railway motive power, knows what a large item in the expense account is due to these staybolts. They break or leak continually, and there is no section of the locomotive causing more expense, trouble and annoyance than this bolted portion. When high pressures are carried, it becomes necessary to place the bolts four inches or less on centres, and they consequently fill up a large portion of the water-legs and the space above the crown sheet. When bad water is used, they become encrusted and still further prevent circulation, and the more they become encrusted the more unequally do the firebox, crown and sides expand and contract in relation to the outer shell, and therefore, the more the staybolts leak or break. It was to overcome this staybolt problem that the so-called Vanderbilt Locomotive Boiler was designed, it having occurred to the inventor that if a cylindrical firebox could be introduced in the locomotive boiler, enormous savings in repairs would result.

Now this was not a startlingly new idea in itself, for it is a well known fact that cylindrical fireboxes are usually employed in marine boilers, these fireboxes being corrugated in various forms to insure the necessary strength. An inventor named Strong had devised a boiler having two cylindrical furnaces, and a cylindrical combustion chamber in front. A German also had attempted to use a single flue that employed no stays or braces of any sort. This latter arrangement, though somewhat closely approaching Mr. Vanderbilt's idea, was exceedingly defective, and in fact a complete failure, for a trial boiler constructed according to the inventor's plans exploded and put an end to the use of cylindrical fireboxes in European locomotives. After Mr. Vanderbilt had carefully considered the above attempts, he came to the

conclusion that the failure was due to the simple fact that the fireboxes were too small to allow sufficient space above the grates for the proper mingling of the gases, and the small combustion chambers beyond the grates were also inadequate for this purpose. Fireboxes of about the size employed in marine boilers were used, but without the combustion chambers to give a space to properly consume the gases, and the result was the combustion was unsatisfactory.

The American Railway clearances and limiting weights allow for larger boilers than those used on European railways, and for this reason cylindrical fireboxes of very large diameter can be used; and in order to get sufficient space over the grates, advantage can be taken of the relation of the area of a circle to its diameter.

The design of the original Vanderbilt Boiler is shown in the accompanying cut. It was built for a ten-wheel locomotive constructed at the West Albany shops of the New York Central and Hudson River R. R., and completed in August, 1899. The total weight of the locomotive is 160,000 pounds, 113,300 of which is on the drivers and 46,600 on the truck. The



cylinders are 19 1/2 inches by 26 inches, and drivers 61 inches, the tube heating surface is 2165 square feet, the firebox heating surface 135 square feet, grate area 34 square feet. The firebox is of the Morison suspension type, with an internal diameter of 59 inches, and is 11 feet 2 1/4 inches long. An illustration of this firebox is shown on the front page. It was made by the Continental Iron Works, Greenpoint, Brooklyn, and is the largest corrugated furnace ever rolled. Mr. Vanderbilt, the inventor, is represented in this illustration. The firebox was tested under an external pressure of 500 pounds per square inch before being put in the boiler, where it is carried at its front end by the backhead. The grates, which are not shown in the boiler drawing, run from the rear end 7 feet 9 inches to a bridge wall which is carried by half-round iron, resting in one of the corrugations. There is a brick arch on top of this, and the inside of the backhead is also lined with fire-brick. The space in front of the brick arch is used as a combustion chamber, and allows space for the proper mingling of the products of combustion, and also allows the gases to be drawn through the lower tubes.

It is seen that the axis on the rear

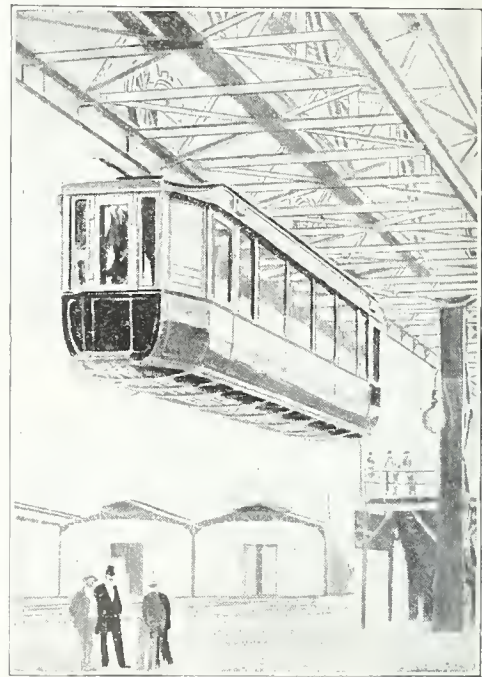
portion of the boiler shell is inclined towards the rear downwardly. This allows a lower fire-door and also causes better draft through the lower tubes, since it permits the front end of the grates and the brick arch to be lower. The firebox is placed eccentrically in the rear portion of the boiler; that is, its axis is inclined towards the rear downwardly with respect to the axis of the shell.

This locomotive has been running since its delivery, in regular fast freight service on the Mohawk Division of the New York Central & Hudson River Railroad. Last August, after it had been in service for one year, it was taken to the shop for the usual overhauling, and a statement of the actual cost of all material and repairs made during the first year's service, shows that the total cost of labor was \$1,039.45, and materials \$417.97. This includes several items not properly chargeable to boilers.

The number of miles run was 54,650, with 9,019 cars west and 7,616 cars east. The cost of repairs per engine mile is, therefore, 8.66 cents. This is very low in comparison with the average repairs to locomotives, especially when it is considered that this loco-

OVERHEAD RAILWAYS.

In the matter of overhead railways, this country is far behind Europe. While we have the Ferris wheel, the loop-the-loop and shoot-the-chute for pleasure purposes, there have been no efforts by American engineers to con-



struct an aerial railway such as are now becoming common in Europe.

THE INVENTIVE AGE has frequently referred to the work of Europeans on this subject. In the June, 1900 issue, it gave a full description and illustration of the Barmen Railway. In May 1901, appeared an illustration of the Aerial Ferry at Rouen, France. In August 1901, the AGE illustrated and described the suspension railway which has been erected on the banks of the river Elbe, in Saxony, Germany, and now we reproduce in this month's issue of the AGE an illustration of a suspension railway which was erected at Vincennes, France, during the Paris Exposition.

The cars travel at a speed of twenty miles an hour, and yet there is absolutely no swaying. The great advantages are that any number of cars can be despatched by this line traveling at high speed, and subject to no interruptions.

While we have in New York and Chicago elevated railways, they are not suspended railways such as are rapidly being introduced throughout Europe. The advantage of the suspended railway in crossing rivers is that the track structure can be placed high enough above the river so as not to interfere with the navigation of the stream, thus dispensing with the necessity of providing draw bridges.

We have never seen it explained why this type of railway has not been put in use in this country. There are certain advantages inherent in the structure, and we can see no disadvantages. It is not an experiment by any means, because one of them has been in use near Bilbao, Spain, since 1893, where, with a span of 525 feet, the method has been successfully operated down to the present time.

A Yankee Genius.

Won Success Through Patents.

James M. Moody, the subject of this sketch, was born in Harwich, Cape Cod, Massachusetts, August 21, 1859, of old Puritan stock. He was educated in the common schools, and has had quite a wide experience, among other things taking out eight patents. Beginning in boyhood, he learned the carpenter's trade, and worked at it until 1884, when having amassed one hundred and fifty dollars, and gained a reputation for honesty and industry, he started in the lumber and hardware business near the railway station at Harwich. In his new location he soon saw the need of a better rail joint; and set about, in connection with his brother, who was working for him, to invent one, with the result that the "Perfect" Railway Railjoint was developed, which was patented in 1888. The patent right was sold for cash, and a company formed to manu-



JAMES M. MOODY.

facture it; but before work was started, some of the promoters of the company failed in business, and the invention was never developed. It stands today the best rail joint ever invented.

His next patent was an ice cutting machine. This was not pushed. After that came a combined dictionary holder and music stand. This he manufactured and sold quite extensively, and at the same time patented and manufactured a coal hod, but business depression came on and this was abandoned.

In the vicinity of Cape Cod the cultivation of the cranberry was commenced early in the present century, and covers wide tracts of waste land which have been utilized for the purpose. Air and moisture are the chief requisites for the development of the cranberry plant. It is cultivated on a soil of peat and vegetable mould free from loam and clay, cleared of turf, and having a surface layer of sand. The ground must be thoroughly drained and should be provided with a supply of water, and a dam for flooding the plants during the winter months to protect them from frost, and occasionally during other seasons to destroy insect pests. All these

conditions are easily met in the region about Cape Cod. The land is low, easily flooded, and marshy. Originally worth no more than \$10 to \$20 an acre, it has been made to yield annually two or three hundred dollars worth of the fruit per acre. The cranberries should be gathered when ripe and dry, otherwise they do not keep well.

Having been familiar with these matters all his life, and knowing well the peculiar conditions connected with the picking of the fruit, and seeing that the people needed improved facilities to pick or gather the berries, Mr. Moody turned his attention to the invention of a hand cranberry picker, and patented it in 1893. A little later there was an urgent demand for a large cranberry gatherer, and he met this with his patent dated July 3, 1894. This was his most successful patent financially. He started to manufacture and sell it, and sold out the right at a good cash price. In the meantime, in 1890, he sold out his lumber and hardware business and embarked in the retail furniture business under the firm name of J. M. & S. B. Moody, and in 1892, added the retail grocery business. Later, he sold out his interest in the furniture and grocery business, and turned to carpentering again and worked at his trade until the spring of 1898, when he had a serious attack of the Alaska gold fever, and on March 9, started for Seattle en route for the north. After rather a rough passage of ten days across the North Pacific, he landed at Sunrise City, Turnagain Arm, Cooks Inlet. On looking over the country and prospecting, the conditions appeared so unfavorable, that he decided the best thing to do was to get back while he had money enough to return, and he arrived home June 23. The following September he repurchased the lumber and hardware business at his old stand, and is still doing business there.

His latest patent is a blacking brush for liquid blacking, granted May 7, 1901. During the past year, in connection with others, he has formed the corporation known as the Circle Manufacturing Company, for the manufacture and sale of shoe, stove, furniture, and bicycle polishes, of which he is Secretary and Treasurer.

Mr. Moody says the easiest money he ever made was through patents, and the best attorney he ever employed, is E. G. Siggers, of Washington, D. C.

Find Your Place and Fill It.

It is a sad parody on life to see a man earning his living by a vocation which has never received his approval. It is pitiable to see a youth, with the image of power and destiny stamped upon him, trying to support himself in a mean, contemptible occupation, which dwarfs his nature, and makes him despise himself; an occupation which is constantly condemning him, ostracizing him from all that is best and truest in life. Dig trenches, shovel coal, carry a hod; do anything rather than sacrifice your self-respect, blunt your sense of right and wrong, and shut yourself off forever from the true joy of living, which comes only from the consciousness of doing one's best—*Success*.

AUTOMOBILE ICE WAGON.

Self-satisfaction is often mistaken for conservatism. This is true of individuals as well as of nations. Americans, for some reason, seem to be loath to take up new ideas. This has been shown particularly in the matter of the automobile and the flying machine. Professor Langley, of the Smithsonian Institute, has had to proceed practically alone in his attempts to navigate the air, and automobiles had become an established thing in France and Germany when they were merely a novelty here. That we are making rapid advances in automobile con-

struction is manifest, still we are far behind Europe in the special applications.

The accompanying illustration represents what might be termed an ice wagon automobile. The Crystal Ice Company, of Vienna, has placed this automobile ice wagon in its service. It was built by the Daimler Works, and has a capacity of 6,000 pounds.

"How would you like to be the ice man?" is a street phrase mostly current during the summer season. Well, he has his troubles to be sure, but think what an easy thing it would be to deliver ice in this automobile! It would seem like playing at work, wouldn't it?



CARRIAGES IN ASIA MINOR.

The kind of vehicle used in Asia Minor is shown in the accompanying illustration. The heavy wheels will be noted as a characteristic feature. Vice Consul Ojalva, writes to the State Department, that the Russian make of carriages is most popular there, as it is made strong enough to resist the rough roads of the country. The cost is from \$200 to \$250, delivered at the frontier.



Petroleum automobiles, the vice consul thinks, can be readily introduced in that country if they are strongly made, and cost about \$300 or \$400 for four seats. The ox cart, which was the favorite means of traveling for the people of Asia Minor, is now almost neglected, and the carriage is taking its place.

German Life-Saving Apparatus.

It has often happened that on account of darkness, life belts could not be seen when thrown to persons who had fallen overboard at night. Buoys with life belts attached and supplied with 8-candlepower electric lights have been constructed heretofore, but their use was confined to vessels equipped with electric-lighting plants, and their heavy weight requiring three or four men to handle them, was a serious handicap.

The new apparatus weighs but 33 pounds and produces a light equal to 150 candlepower. The buoy is of a globular form, carries from two to four life belts, and supports a long cylinder of sheet tin having twelve compartments filled with calcium carbide. These compartments are arranged at different elevations. When the apparatus is thrown into the sea, the water passes through perforations in the bottom of the cylinder and, coming in contact with the carbide, generates acetylene gas. Each compartment is connected with a burner by a pipe, proper valves preventing the escape of the gas except through the burner. When the volume of gas in the cylinder decreases, hydrostatic pressure opens the valves and allows water to enter the next compartment to generate an additional supply of gas. The gas is lighted electrically, and ignition takes place in about twenty-five seconds after the buoy is thrown into the sea. The flame is protected from the wind by glass and burns steadily and with great intensity for three or four hours.

Cleaning and filling the apparatus requires only a few minutes. The cost of charge is only about 12 cents.

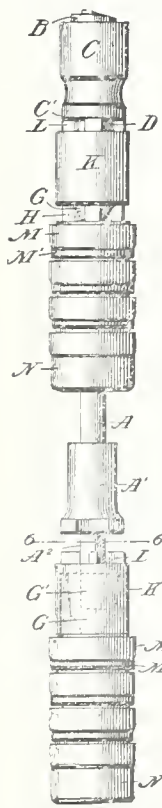
The advantages claimed for the invention are: First, that it can be used on all kinds of vessels; second, that it may be used for general lighting purposes; third, its cheapness and light weight.

CLEVER NEW PATENTS.

Valved Piston.—Land Roller and Pulverizer.—Sash Fastener.—Saw Set.—Solar Heater.—Display Box.

Valved Piston.

Of little interest to the general reader but of vast importance to the trade is the improved valve piston invented by Samuel M. Fulton, of Galt, Cal., illustrated below. The object of the invention is to provide a structure of valved piston having two independent seats for the valve or clapper thereof and permitting the maximum amount of space in the passages through the piston for liquid, and placing the strain vertically upon the metal composing the valve seats.



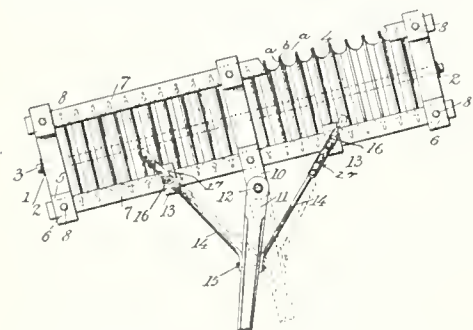
The invention has for a further object to provide an improved construction of clapper adapted to permit the passage of water through the same and also to cooperate with two valve-seats disposed upon different horizontal planes, whereby the water may pass freely through the piston, thus reducing the material resistance to the latter's movement through the liquid.

For purposes of clear illustration to those skilled in the art, the piston is shown in connection with a double pump, wherein the pistons move alternately toward and from each other.

In such a structure of pump the lower piston or plunger is reciprocated by means of the rod A, while the upper piston is similarly operated by means of the hollow sleeve B, which is moved independently of the rod A.

Land Roller and Pulverizer.

Farmers and agriculturists generally, will certainly be interested in a new land roller and pulverizer that Mr. Robert Newton, of Jerseyville, Illinois, has just patented. Mr. Newton's machine is evidently the result of much thought and study, and was devised with a full knowledge of the needs and results to be accomplished.

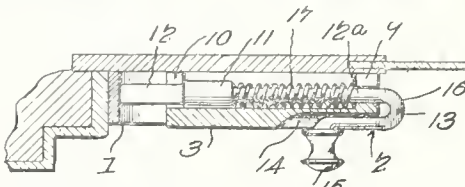
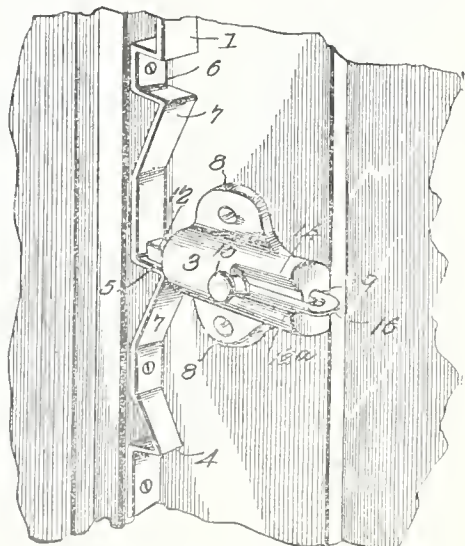


He constructs a suitable frame comprising parallel horizontal bars, to which he pivots a tongue that can be adjusted and held against movement with relation to the frame by means of braces. Upon the horizontal bars are slidably mounted hangers that can be moved toward or from each other, and upon the lower ends of these hangers is attached a shaft, said shaft carrying

a number of roller disks. In practice, the hangers are so adjusted on the shaft and beams that the roller disks are clamped closely together, to prevent earth from getting between their opposing sides. These disks are provided with double beveled peripheries which enable them to cut into the soil and pulverize the same, at the same time serving as rollers.

Sash Fastener.

It would seem as if inventions in the line of window locks must have run out, and yet Mr. Will S. James, a well-known Texan, residing at Forth Worth, has just patented an ingenious sash fastener. A ratchet strip 1 is attached to the side of the window frame and is provided with suitable shoulders and sockets 4, 5 and 6 that are engaged by a novel locking bolt



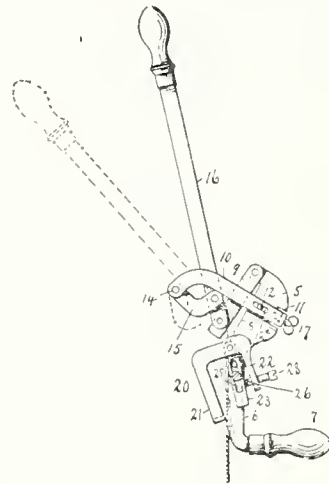
secured to the window sash. The construction of this bolt is shown in the second figure of the cut, wherein it will be noted that a hollow casing 3 is provided having an exterior groove 14, and a spring-pressed bolt 12 is slidably mounted in this casing and has its rear end bent, so as to fit in the groove 24, said end being provided with a projecting handle knob 15. The device can be readily applied by any one to a window, and will either lock the same closed or at any desired elevation.

Saw Set.

A very useful instrument in the shape of a saw set has just been patented by Mr. Samuel Haltom, of Henderson, Texas, whose idea is to provide a device wherein there will be so great a leverage that little effort is required to set the heaviest and stiffest saws. A further object being to provide a construction wherein several parts may be accurately and easily adjusted for operation under different conditions.

A very good idea of this machine may be obtained by reference to the accompanying illustration, wherein it is shown in operative position upon a saw blade. A body is provided including a head 5, a shank 6, and an offset handle 7, the head having an inclined face as 8, upon which the teeth are bent. At the upper end of this face 8 is pivoted a setting jaw 9, by means of which the saw teeth are

set, this being accomplished by bending the teeth with this jaw, over the face 8. To move the setting jaw, a handle 16 is pivoted thereto, said handle being supported by means of a pivoted link 15 to a hanger 10, that is

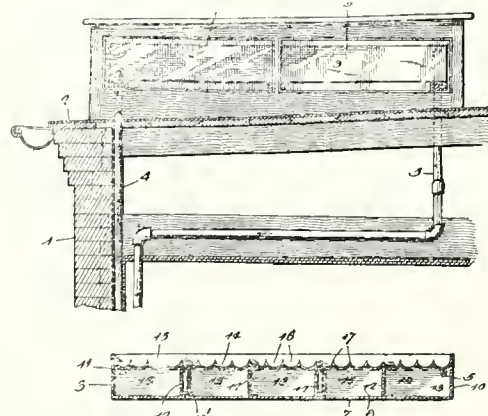


adjustably secured to the head through the medium of pins 12, and an adjusting screw 17. It will be seen that when the handle lever is thrown to the position shown in dotted lines, the jaw 9 will bear upon the end of the tooth and bend it over the inclined face 8.

In order to properly support the machine upon a saw, a guide is provided consisting of a U-shaped plate 20 having arms 21 and 22 that embrace the saw, one of these arms being provided with a set screw 28, by means of which the other arm can be clamped against the saw blade. By adjusting the several screws above noted, the relation of the machine to the saw may be changed so that the teeth will be set to the angle desired, and furthermore, these teeth will all be bent to the same degree, thereby insuring a smooth and even cut with the saw.

Solar Heater.

The idea of utilizing the sun's heat for domestic ends is of course a very old one and there have been numberless attempts to effect this purpose. All seem to have failed in practice until the recent invention of a solar heater devised by James M. Wishart, of Oakland, Calif., and erected in that cloudless region. The object of the invention is to provide a heater to constitute a part of a circulatory water system, the liquid being caused to circulate through a number of chambers, the circulation being maintained by the effect of the solar heat.

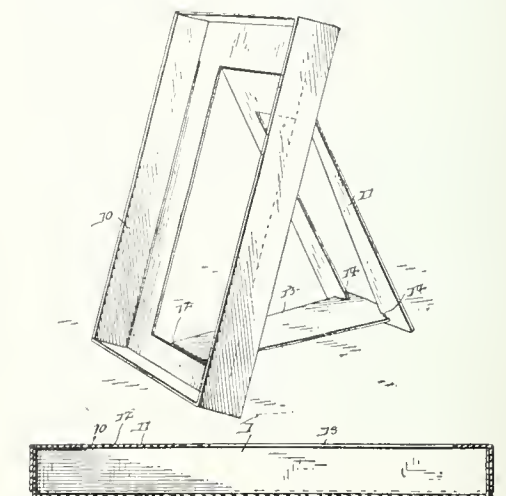


The advantage of Mr. Wishart's system is that it is capable of application to the roof of any house and requires no burning glass to concentrate the sun's rays upon it. The figures show a section through a roof carrying the "boiler" of the heater, and a section through the motor showing its internal arrangement. It is provided with a series of equidistant longitudi-

nal partitions 12, terminating somewhat below the upper edge of the receptacle and dividing the latter into a number of longitudinal circulating-chambers 13. The top wall or absorption-plate 14 of the heater, is supported upon the upper edges of the partitions 12 in a manner to leave a space 15 between its surface and the upper edge of the receptacle, and is longitudinally fluted, as indicated at 16, to form an extended series of longitudinal concavities. By means of this configuration of the absorption-plate, the maximum exposed surface or effective heating area is obtained. Pipes admit cold water at one end and take out hot water at the other, thus doing away with the necessity of a water back in the kitchen.

Display Box.

One of the cleverest arrangements that has yet appeared for holding boxes so as to display their contents has been patented by Andrew L. Weis, a resident of Toledo, Ohio. He constructs the cover so that it may be made into an easel upon which the box is placed. The box-body may be of any suitable form or material, and may have compartments or divisions or not as may be desired. The lid or cover is fitted over the body in the usual manner to protect the contents thereof, but is constructed and ar-



ranged to produce an easel without in the least detracting from the utility as a cover. We present herewith, a cut of one of the best forms. One view shows the box open for display purposes. The other view illustrates the closed position. The lid or cover 10 is rigid from end to end, and from the top a prop 11 is cut along two sides and one end, and formed with a scored hinge 12 at the opposite extremity to preserve the integrity with the top of the lid or cover. A tongue 14 is cut from the prop, and is smaller at one end than the other, the small end of the tongue being left connected with the top of the lid or cover at the center of the end, opposite that adjacent to which the prop is hinged. The tongue 13 has its larger end in engagement with the slot in the prop, and when the prop and tongue arranged to hold the lid or cover for display purposes, the enlarged end of the tongue is pushed down to the smaller extremity of the slot in the prop, as shown, and to prevent accidental disengagement of the enlarged tongue end from the prop, it is formed with transverse slots 15 14 which permit a portion of the same to embrace the prop, adjacent the opening therein. When the lid or cover is arranged to close the box-body, the tongue and prop are closed into the opening flush with the wall.

MALT FROM RICE IN GERMANY.

Mr. Eugene C. Schrottky, residing in Dresden, has invented a process for making malt from rice, which has proven successful and promises to cheapen the cost of producing malt liquors in Europe.

This invention may not be valuable in the United States and Canada, where the production of barley is large and the cost comparatively low; but in Europe and Great Britain, it seems likely to cheapen the cost of producing malt liquors, which are consumed in such large quantities.

A primitive method of malting rice has been known in Asia for many years, but the arrack produced is a fiery liquor, and the so-called rice beer did not find favor except with the natives. The inventor claims that in the old process, only about 40 per cent of the rice germinated, an equal amount failed to germinate, while 20 per cent decayed, tainting the fermented portion, resulting in an unwholesome product. The new process is as follows:

The unshelled rice, which first of all may be subjected to a preparatory treatment of washing, sorting, and cleaning, is put into water-tight vats, provided with a false, perforated bottom, and with inlet and outlet for water.

The rice should be in a layer about 6 inches thick, covered with water of ordinary temperature to the depth of an inch or so. The rice should be well stirred—all husks and light grain being removed—and whatever floats on top of the water should be drawn off.

Then a second supply of water, of 35° to 38° C., is turned on, and the grain should steep in this for some time, the temperature being kept up. This may be done by arranging a steam pipe below the false, perforated bottom, or flues for hot gases may be constructed under the reservoir. By suitable cocks in the piping or dampers in the flues, the temperature of the water may be controlled.

When fresh rice is used, this soaking process should last from twenty-four to thirty hours; for old rice, however, forty-eight to fifty-four hours are necessary, the temperature being maintained at 35° C. The steeping should be arranged so that the necessary period should elapse in the evening, when the water is drawn off and the rice allowed to remain without water that night. By keeping the water outlet pipes below the false bottom open, the air is allowed to pass freely through the layer of rice, or it may be pumped through, so that the grain will have ample facility to absorb the oxygen necessary for the process of germination.

Next morning, a fresh supply of water of 35° to 38° C. is turned on, covering the rice for about 3 inches, and kept on for twelve hours, when it is again let off, and the rice remains without it for the night. This alternate treatment of the grain—viz, in water during the day, and without water with free access to the air during the night—is continued for five or six days.

It is of advantage, also, to keep the temperature of the malting house at 30° C.

This alternating treatment and the maintenance of the necessary temperature are the main conditions for successful and satisfactory malting.

The periodical drawing off of the water may be dispensed with by pumping air through the rice layer. This method, however, has not been found to yield as good results as that above described.

At the end of the five or six days' treatment, nearly every grain of rice will be found to have germinated, and the sprouts will have grown about twice as long as the rice grains.

After germination has proceeded sufficiently for the development of the diastase, the grain should be carefully shoveled together so as to make a layer of 12 inches, to gain warmth for the final development. No water is put on, and in the evening the heap is opened out and reduced again to a layer of 6 inches, or even less, to prevent overheating. On the following morning the malt will be found ready, and can then be dried in the usual way, or used at once as "green" malt for the manufacture of beer, spirit, or glucose.

Making Lead Pencils.

The use of graphite in the manufacture of lead pencils dates back several centuries. Strips of black lead were cut out of larger pieces of mineral, and inserted in grooves cut in small bars of wood.

About a hundred years ago, a Frenchman devised the method of manufacture which is now universally followed. In this process, the graphite and the clay are ground to the finest possible state of division, mixed together, filtered and caked by hydraulic filters, and again mixed by repeated forcing through plates perforated by many minute holes. It is then placed in hydraulic presses and forced through dies into the shape and size required. As it issues from the press, it resembles nothing more strongly than a long, round, black cord. It is laid out straight on boards, and when dry it is cut up into proper lengths. It is then packed into plumbage crucibles and fired in kilns.

Red cedar is the wood most universally employed in pencil making, though poplar is sometimes used for cheaper grades, and for slate pencils. The cedar logs are sawed up in small slabs of the proper length for pencil, and of a sufficient width for four, five or six pencils. This is grooved lengthwise, the groove being exactly the diameter of the lead which it is to receive. The leads are laid in the grooves and another similar block is glued firmly thereto. The resulting slab is then run through shaping machines, which cut each individual pencil from the larger block. The pencils are then ready for the further operations of varnishing, polishing, stamping, etc. The grades of hardness of pencils are dependent upon the relative percentage of clay contained in the mixture, the larger the amount of clay, the harder the grade. Colored and slate pencils are made in much the same manner, other pigments being substituted for the black lead.

MAKING PAPER FROM BARK IN MADAGASCAR.

The manufacture of paper by the Antaimoro (one of the oldest tribes among the inhabitants of Madagascar), which is completely unknown to the other tribes of the island, constitutes a regular local industry in the district of Ambolipeno. Only a limited number of persons, descendants of the same family, belonging to the Arabs from the coast of Africa, know the secret of this manufacture, and devote themselves to it whenever a pressing need of money, or a desire to purchase some long-wished-for article, compels them to shake off their native indolence.

The paper, which is supple and very strong and has an appearance of parchment, which gives it the imprint of quaint originality, is in great favor with the Antaimoro, and there is not a family—not a home—that does not possess a dozen or so sheets, carefully stitched together and handed down from generation to generation.

In these parchments there are religiously preserved the family traditions, chronicles of past events, the history of former wars, the unchangeable decrees of their ancestors—in a word, the whole of the national manners and customs. It is in these documents that the followers of Islamism—very sparse in that region—transcribe and study the law of the Prophet; it is, in fact, in these scrolls that the Antaimoro, suspicious and greedy of gain, calculates the profit on his oxen and the product of his rice fields.

This quaint agglomeration of Arabic hieroglyphics, with Malagasy sentences and figures in the same volume—which the owner will only part with for its weight in gold—ought to furnish the bibliophile a document decidedly out of the common.

The manufacturer of this peculiar paper was apparently a man cast on the coast in the middle of the ninth century, who settled on the Matitianana River.

Tradition represents him as horrified at seeing his Koran torn, doubt-

less due to the stirring adventures of his voyage, and puzzling his brain to make a clean copy. Experimenting with different barks of trees, he finally fixed his choice on the avoavo, the bark of which is easily reducible to pulp.

After taking off the outer skin, which is of the grayish tint peculiar to trees in general, the inner part, perfectly white and somewhat sticky, is removed and formed into a big ball, which is placed in running water to soak. This ball is picked to pieces little by little, and the pieces thus separated are washed and placed in a large pot with a certain quantity of water; the mass is then covered with ashes, followed by a second layer of bark, again covered with ashes, and so on until the pot is three-quarters full. The pot is then filled with water, the lid put on, and the whole boiled for two or three days without interruption, care being taken to add very clean water from time to time to replace the loss by evaporation, always throwing in a handful of ashes.

On the morning of the third day, the bark, completely reduced by cooking, looks like a thick batter, which is then passed through a sieve and washed in fresh water. It is then beaten, briskly kneaded, and under the pressure of the fingers is transformed into a soft dough, which is spread, still damp, on the green leaves of the traveler's tree with a special tool, consisting of two rods about 18 inches long, joined by slats of ruffa wood, the only wood, apparently, to which the pulp will not stick. This is the most delicate part of the whole operation.

With the flat of the hand, moistened, the required thickness is given to the sheet; it is then pressed, leveled, smoothed, and put in the sun.

As soon as it is dry, it is glazed with weak rice water, spread with the hand, like starch, on linen. The sheet, still in a damp state, is then, as it were, ironed out by the hand or with a polished pebble. It is finally dried, peeled off from the green leaf, and the paper is finished. Each sheet thus obtained is worth from 1 to 2 cents. It measures 20 to 23 inches long and 10 inches wide. It is finally trimmed for binding.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. SIGGERS, Washington, D. C.

Richard B. Dixon, Calgary, Alta, Canada. Ball Bearing Castor. Assignees W. J. T. Lee, & S. W. Howard, Toronto.—The novelty of this invention resides in the casing comprising sections, stamped from sheet metal, and when secured together constitute a rigid boxing in which is located a projecting bearing ball resting upon a plurality of loose anti-friction balls. The device is very simple in construction, and can be manufactured at small cost.

* * *

John H. Priestley, Aurelia, Iowa. Wagon Body Raiser.—A pair of spaced supporting elements are provided between which the wagon having the body to be raised is driven. These elements engage beneath the body, as the vehicle passes through, and automatically raises said body from the running gear. A connection in the form of a loop is made between the body and running gear so as to effect this raising action.

* * *

William T. Hatten, Heppner, Oregon. Wrench.—This patent marks an important improvement on an effective wrench patented in 1900, and described in the July number of the INVENTIVE AGE for that year. In the present case he provides a jaw which is freely slidable upon the usual shank, this jaw being held against movement by means of a clutch pivoted thereto. The clutch is provided with an offset handle portion located close to the movable jaw, and it is thrown into action by a coiled spring interposed between this handle portion and the jaw. The inventor has had marked success with his wrench patents.

* * *

William M. Woodworth, Sycamore, Indiana. Railway Tie.—The present inventor has devised several important improvements in this art, the present consisting of a metallic tie having bearing blocks at its ends, upon which the rails rest. The rails are held against spreading by means of spring braces that hook beneath them, and are adjustably secured to the tie between the rails. This arrangement will prevent many serious accidents now caused by the spreading of the rails.

* * *

Charles O. Lett, Eclectic, Alabama. Apiary.—Progressive beekeepers will certainly be interested in this invention, for Mr. Lett has devised a support for hives which will prevent the access of mice, ants, or other vermin thereto. He provides an open structure comprising suitable standards that support an enclosed loft, the space beneath said loft being open. A platform is suspended beneath this loft and the hives are placed upon said platform. By this arrangement, the hives are shielded from the sun and rain, while there is nothing to interfere with the free movements of the bees. A further novel feature of the invention resides in the arrangement of the platform which can be moved upwardly so as to carry the hives into the loft, where they will be completely protected from the elements. A very broad patent has been obtained on this structure.

* * *

William H. Etter, Marietta, Ohio. Twine Holder.—In this instance, the inventor has provided means which will remove the end of the twine from a counter, but will clamp it to prevent its being jerked into the holder and

becoming twisted in the same. He provides a suitable frame in which the ball of cord is journaled, and from this frame suspends a tube in which is slidably mounted a weight. The twine passes down through this tube through an eye in the weight, then up over a bar in the upper end of the tube and finally down through an opening in the lower end, to the counter. As a result, when the twine is drawn from the spool or ball, the weight will first be raised to the top of the tube, and as soon as said twine is broken and the end released, the weight will drop, thereby raising the broken end, and at the same time clamping the portion of the twine which passes through the tube. The advantage of this construction will be readily apparent to users of this article.

* * *

Horace D. Payne, Thompson, Pa. Crape Holder.—In these days, when so many electric bells are employed, undertakers have great trouble in applying crape to the door, and it has become the custom to nail it to the casing. This besides marring the woodwork, creates an unseemly disturbance, and it was for the purpose of overcoming these objectionable features that Mr. Payne devised the present holder. It consists of a clamp of novel construction which is provided with a pair of jaws that can be engaged on opposite sides of the central stile of the door or other support. The clamp furthermore, is provided with means to which the crape may be secured.

* * *

Henderson P. Childress, Memphis, Tenn. Trace Fastener.—The difficulty of unfastening traces from whiffle-trees is well known, but if any one wishes a simple device that will form a secure lock, that can be easily operated, he will be interested in this one. It is nothing more than a wire bent into a peculiar form having one end secured to the whiffletree, an intermediate portion being bent to constitute a locking shoulder and passing through said whiffletree, while the other end is offset and freely movable. A trace will easily slip over this lock and be securely held thereby, and to remove it, it is only necessary to press the lock inwardly upon the tree, whereupon the free end will automatically move the trace over the holding shoulder and it can thereupon be readily removed.

* * *

William Borrmann, Norfolk, N. Y. Christmas Tree Holder.—Probably one of the hardest jobs for the head of the household at Christmas time is to make the Christmas tree stand up, and trim it so the decorations will not catch fire, yet with the above device no accidents can happen. It comprises a foldable fence suitably ornamented, which is placed about the tree, and not only forms stable support therefor, but beautifies it. Upon the standards forming a part of this fence, are adjustably located candle holders, which can be moved so that they will not be in dangerous proximity to any combustible matter.

* * *

Mrs. Emily C. Duncan, Jennings, La. Bevel Square.—This device will be of interest to carpenters and like artisans, for it is an instrument that will be useful in many ways. It consists of a pair of pivotally connected limbs or members, one of which consists of separate sections independently pivoted to the other member, and connected at their outer ends by a link. This arrangement maintains the opposite edges of the pivotal member in parallelism, and provide a structure which can be used for measuring angles. A suitable scale is provided which automatically indicates the angle at which the two limbs or member are placed.

Charles I. Simpson, St. Louis, Mo. Water Filter.—A filter of more than passing interest, providing for effectually filtering a large amount of water with a comparatively small casing, which is made detachable in parts so as to give convenient access to the interior thereof for the purpose of repair, etc. The device embodies a casing formed in detachable top and bottom members, with a concavo-convex filter stone, a foraminous plate carried by the upper member together with a pipe to spray the incoming water over the entire surface of the filter stone, a rotatable cleansing brush between the plate and the stone, and a crank-shaft for rotating the brush in frictional engagement with the stone to cleanse the upper surface thereof.

* * *

Thomas R. Tyndall, Winterville, N. C. Tobacco Truck.—This invention relates more particularly to the front guide wheel truck of a tobacco truck proper, and embodies a horizontal skeleton frame within which is mounted a supporting wheel, whereby the frame forms a fender entirely surrounding the wheel. A draw-bar is supported above the wheel by standards rising from the frame, and is provided with an intermediate king-bolt opening in vertical alignment with the axle of the wheel, so that the weight of the forward end of the truck body is placed directly upon the axle. The front end of the draw-bar is projected in front of the truck and provided with a draft connection.

* * *

George H. Nicol & John M. Lionberger, Dallas City, Ill. Buck Saw.—The frame of this saw is formed of angle metal to produce a durable and inexpensive frame. Each of the front and rear arms is formed by a pair of angle bars, which have corresponding members riveted together and disposed upon the inner side of the arm to form a stiffening rib therefor. A cross-bar is also formed of two angle bar sections, which have corresponding members riveted and embracing the ribs of the front and rear arms and riveted thereto. A pair of angle brace plates are fitted snugly between the cross-bar and the front arm, and the saw-blade has its opposite ends fitted between and secured to the connected rib portions of the respective front and rear arms.

* * *

John P. Ashby & Samuel H. Miller, Oklahoma City, O. T. Dowel Connection.—This invention is designed for connecting stone slabs, and consists in providing the meeting faces of such slabs with registering undercut sockets one of said faces being provided with a groove leading to the socket. A pair of dowel pins having beveled heads are fitted into the sockets, and then a wedge is driven through the groove and between the dowels so as to spread the same and force their beveled heads into engagement with the undercut portions of the sockets, and thereby interlock the slabs in a strong and durable manner.

* * *

Millard F. Kirkpatrick of Boise, Idaho, is a practical mining engineer, and a patent recently issued to him is of unusual interest in mining circles.

In placer mining a large percentage of value is retained in the crevices of heavy rocks thrown down into the ground sluices, and is lost because of the necessity for removing the rocks to clear the sluices. Mr. Kirkpatrick has conceived the idea of rescuing these values by means of a novel dipper or grizzly for the derricks employed in the removal of the gold-bearing rocks. The dipper is of screen or open-work form, and is equipped with means whereby, as the derrick is removing the rocks, the gold-bearing sand will be detached from the latter and dropped back into the sluice. The patent is of such breadth as to comprehend any means

whatever for detaching loose values from the contents of the dipper, but by preference a myriad of tiny streams of water are projected against the rock by means of spraying devices carried by the dipper. This effectually detaches the gold-bearing sand, and permits it to drop through the open walls of the dipper before the contents thereof are deposited upon the rock pile at the side of the sluice.

* * *

William H. Sidenstricker, Moberly, Missouri. Ink Well.—The ink well shown in this patent includes a reservoir for containing a considerable quantity of ink, and surmounted by a small dip well. By squeezing a rubber bulb attached to the reservoir, the dip well is supplied with a quantity of ink sufficient for immediate use. In this way only a very small portion of the ink is exposed to the air, and is returned to the reservoir when no longer desired for use. It is therefore impossible for the ink to become thick by evaporation. The well is also equipped with an ingenious device which permits the reservoir to be filled through the dip well, thus avoiding the necessity for handling the well when refilling the same.

* * *

James W. Brown, Brockton, Mass. Sanitary Plumbing System.—Mr. Brown's improvements in plumbing are practical developments in the art, and will help to solve the problem of perfect sanitation. His patent discloses a novel coupling for connecting the bowl to the soil pipe, and also an ingenious joint between the coupling, or bend, and the lead sleeve. The joint will render the parts absolutely gas tight and inseparable after they have once been connected. The coupling member, or bend, extending from the bowl to the soil pipe, is provided at one side with a connection for conveying back pressure gas from the waste trap to the soil pipe at the point above the connection, to prevent syphoning of the closet, and with a second connection for the bath tub waste pipe. The two connections are disposed one above the other, in order to prevent the back pressure, incident to the flushing of the closet, from forcing liquid into the vent pipe.

* * *

George Kelly, Mineral Point, Wis. Insulating Board, Tile or Slab and Composite Material.—Mr. Kelly has added two more to a long list of patents, which have afforded him protection during the growth of his plant at Mineral Point from a modest beginning, to vast proportions. One of these patents covers a self-sustaining board, tile or slab, of great lightness and absolute non conductivity, for insulating purposes. The slab is composed of mineral wool and paper pulp, commingled in the proper proportions and pressed, and, because of its light weight, is particularly adapted for the insulation of cold storage plants. The excellent insulating properties of this tile are such, however, as to render it available wherever insulation is desired.

The other patent is for a composite insulating material composed of wool and a sustaining body of flax fibre, with or without a paper or other flexible covering, stitched, or otherwise secured in place. In the preferred form of this invention the flax fibre and mineral wool are disposed in alternating layers, with a covering of paper, and is admirably adapted for lining floors, refrigerators cars and cold storage apartments, or to prevent the radiation of heat from heated surfaces. This material is designed particularly to combine the non-conductive properties of the mineral wool with the self-sustaining quality of the flax fiber, a combination of the two presenting a lining which, while being light and inexpensive, will have no tendency to settle when placed in a perpendicular position, as for instance between walls.



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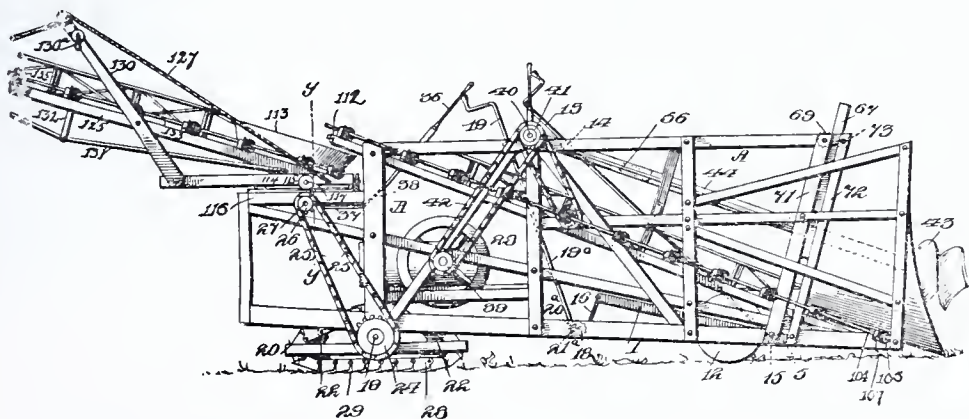
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WASHINGTON, JANUARY, 1902.

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At this season of the year the question of what magazine to subscribe for comes home to the average man for solution. Very few of us can get along without some magazine, and in view of the low subscription price for most of them, it would seem to be an unpardonable sin for any one in this progressive age not to subscribe to one or more of them. The magazines of today are becoming more and more interesting and instructive—in fact they are taking the place of the old masterpieces in literature.

The INVENTIVE AGE has for several months been publishing an advertisement, showing how a number of the best magazines published can be obtained at a price equal to the subscription price of only one of them, if subscribed for alone. The offers are given on page 16 of this issue. The papers are all well-known standard publications, and need no introduction to any one, so that sample copies are unnecessary. These offers may have to be withdrawn any moment, and we advise all our readers to take advantage of the same while they last. It is an unusual opportunity offered, and should be embraced.

Peat as Fuel for Locomotives.

The Vizlanda-Bolmen Railroad, Sweden, recently made an experiment with pressed and dried peat as fuel, with an extra train consisting of locomotive, fifteen loaded freight cars, and one passenger car. The distance was about twenty-two miles, and the time-table was set for lower speed than the ordinary, but this extra train arrived in due time at the respective stations, and at the final station fifteen minutes ahead of time. Considering the fact that the locomotive in use was built for coal only, the result of the trial is regarded as very satisfactory.

A Long Felt Want.

The advent of the asphalt pavement has brought up a new problem for solution. We refer to the difficulty during the winter season of horses retaining their footing on such pavements. When the wooden block and the Belgian block pavements were in use, this difficulty was not noticeable, but in most of the cities of the United States, the asphalt pavement is rapidly gaining ground, as it has been proven to be more serviceable than any other kind of a pavement, besides having the advantages of cleanliness, which, according to the Scriptural doctrine, is "next to Godliness." Every resident of Washington, Cleveland, Buffalo and other places where the asphalt streets predominate has witnessed the same old scenes during the winter season. A rain comes up during the night; the rain ceases; the water freezes on the pavements, and in the morning the milk man, the coal man, the baker and the butcher are unable to deliver their goods, unless they are so fortunate as to have an automobile at their command. Their delivery wagons are practically useless until the horse is "rough shod." The blacksmith is besieged, and for a time a "land office" business is conducted, but there are not enough blacksmiths to go around, and the result is that many poor horses have to be sent out shod with such shoes as to invite disaster.

Just why some one has not originated an invention to supply the horse with an overshoe, which can be applied as quickly as a rubber shoe to a man's foot, is something that we will leave for inventors to answer. We are sure that the want is felt both by man and beast. Without considering the matter from any other standpoint than that of the utilitarian, it must be admitted that there is a great need for some clever inventor to step in and supply the want.

There have been a large number of patents issued on detachable appliances for ordinary horseshoes, whereby a calk attachment may be fitted on each hoof of the horse, but the objection to nearly every one of such attachment is that they take too long to put on, beside requiring more skill than the average man possesses in order to apply them. To our mind, an attachment to fill the want should not involve more work than putting an overshoe on a person's foot. To the inventor who can originate an attachment of this sort, a fortune awaits him. There is no doubt about the demand for it, and we hope that some one of our readers will be fortunate enough to hit on the right plan.

Scientific Associations as Educators.

According to a writer in a prominent scientific journal it is worthy of remark that among the sixty-two men honored by Yale with degrees at the recent bicentennial, not one was an engineer or an inventor. He suggests that the presiding officers of the great engineering societies are proper subjects for academic honors, as these societies have come to be great educational institutions. He says, "Those

who have followed the work accomplished by our different institutes, such as that of the Electrical Engineers, or the societies of Mechanical or Civil Engineers, recognize that these bodies really exercise the function of great post-graduate schools in which the members, who are continuously engaged in technical work, have done more to advance the science than any other agency. If more of the instructors or professors at Yale were members of the American Institute of Electrical Engineers this fact might be better understood at New Haven. For this reason, the president of each of these bodies stands in the position of a president of a post graduate school for the advanced study of a particular branch of engineering, so that it would be a graceful act for some of the leading universities occasionally to recognize this fact by the award of a degree to the president of one of these bodies, when the occupant of that position has been particularly prominent in scholarly attainments, or for engineering achievement."

Fireproof Wood in the United States Navy.

It appears to have been settled at last that the use of fireproof wood, at any rate in the United States Navy, will be very much restricted. In the recently issued annual report of Rear-Admiral Francis T. Bowles, chief of the Bureau of Construction and Repair, it is stated that the bureau, after having conducted an exhaustive investigation of the qualities of fireproofed wood produced by two different processes, has found that while the products of both possess desirable qualities in rendering wood unflammable, they fail to show all the desiderata of a fireproof wood, which include the permanent retentions of the ingredients under all climatic conditions, freedom from corrosive properties, and unaltered strength and durability. The experience of vessels in commission fitted with fireproof wood, as well as the tests conducted by the bureau, showed that there was no practical advantage gained by the use of fireproofed deck planking, or by the use of fireproofed wood below protective decks, and also that owing to the absorptive qualities of this wood, its use was objectionable in those locations. Hence the United States Navy Department has dispensed with the use of fireproofed wood in the Navy, except for such necessary joiner work as may be used above protective decks and on torpedo boats.

The Three-Meal Habit.

Our three-meal habit is a fearful tax on our working capacity; it trebles the temptation to over-eating; our champions stagger under the weight of a physiological handicap; one-half the functional energy of the system is diverted by the exigencies of digestion. No other hygienic mistake has done so much to make us a generation of dyspeptics as the custom of after-dinner work. Its victims, moreover, incur the risk of contracting that form of moral dyspepsia called pessimism. It tends to rob the working-day of its reward.—F. L. Oswald, M. D., in *Success*.

Plain Living and High Thinking.

This combination of words is no mere attempt at a happy phrase, but has a sound physiological basis, says a writer in *The Lancet*: "It is the empty stomach that best suits a full head, and ideas that flow out freely before, retire with the entry of substantial repast. The brain must have more than its share of the circulating blood. There must be no rival in the full liver or the actively digesting glands of the gastric mucous membrane. Do not eat heavily, then, if you are soon to think hard. Either your ideas or your dinner will be neglected and lie a sorry weight upon your head or your epigastrium. Enough fuel to sustain the fire of life is necessary for work, but heap on the coal and you will burden the overburdened flame. The great thinkers, the great workers in any direction but a purely physical one, have for the most part been abstemious men. If not naturally of small appetite, they have exercised constant restraint, grudging from the play of higher functions every moment, and every energy spent upon the animal activities of their nature. Habit soon helps the fine effort of such people, and it becomes natural for them to eat less, to drink less and to sleep less than their fellows. Thus, in a long life of intellectual activity, many scores of hours are utilized for the main purpose, which, in the cases of other men, are squandered upon the dinner table or in the mere nothingness of sleep or idling."

Hardening Steel in Germany.

Vice-Consul-General Murphy sends from Frankfort, the following translation from the *Frankfurter Journal*:

"The Technical High School in Charlottenburg has just completed a series of experiments with a new method for preparing steel, and the result will no doubt attract much attention in interested circles. Experts claim that the new invention may revolutionize the entire metal industry. The inventor, named Giebel, is a small manufacturer in Mecklenburg, who has for years been interested in this new process, but was unwilling to bring it before the public until it had been thoroughly tested by experts. The results reached at the Technical High School were most satisfactory. By the Giebel process, all sorts of steel can be given strength and hardness double that obtained by the Harvey, Krupp, and Boehler processes, in spite of the fact that the production is reduced 50 per cent. Projectiles fired against a 0.35 inch sheet of steel produced by the Giebel process penetrated only to the depth of 0.039 inch, while a similar sheet of Krupp steel was completely penetrated. With sword blades of this material, other sword blades can be shivered as if they were made of wood. A representative of Mr. Giebel will start next week for Pittsburg, to bring the invention to the attention of the great steel kings of America."

Scientific Progress.

New Process of Glazing Crockery.

The English Government has recently enacted a law prohibiting the use of poisonous white-lead glazing in the crockery industry. This has brought forth protests from a number of English manufacturers, who consider the law nearly impossible to comply with. The Rorstrand Porcelain Factory in Sweden and a factory in Dresden, Germany, have, however, solved this important technical problem by mixing the white lead in the glazing with certain substances converting the lead into an insoluble—and thus harmless—silicate of lead. The English Government has sent a chemist to study the new method.

Sawdust as Fuel.

Sawdust in cake form as fuel has been produced in Prussia. These are octagon-shaped bricks, $6\frac{1}{2}$ inches long, $3\frac{1}{2}$ inches wide, and three-fourths of an inch thick; weight, one-half pound each. In the district and surrounding towns where the factory was located, the schools were heated by this fuel, which burns in air-tight stoves without a large flame, and leaves but little ashes. It is an ideal fuel, being clean, and no regulating of the stove being necessary. No binding ingredient is used; the sawdust is dried and pressed in the shape of the briquette. The absence of all tarry or oily substances prevents smoke. The weight of such a briquette indicates the heavy pressure under which it takes its shape, and the edges look like polished oak; in fact, it is heavier than a piece of hard wood of the same size.

Sugar.

The use of sugar is extending marvelously. Sugars and starches are chemically very similar, and all the starch and fat has to be converted into sugar before it can be utilized in the body's processes.

Now in the course of digestion and assimilation the sugars when used up are converted into carbonic gas and water, which we give off as part of our bodily waste, and the profit we get out of this transaction is the production of heat and energy, or the power of doing work. Sugar is not therefore a body-building food, but a power producing material. This fact is being applied practically. For instance, in Paris they are feeding their horses on sugar, or rather, adding sugar to the dietary of the animals, with excellent effects.

Electric Railway vs. the Telephone.

An experiment has been made lately with a view to minimize the inconvenience caused by the effect of the electric currents conveyed by the overhead trolley system to the railways. It is known that if a telephone line runs parallel with that of a railway served by the overhead system, a considerable noise, which seriously affects the telephone, results from the passing of the cars. The recent tests

have shown that the only perfect solution for the difficulty is to insulate completely the telephone line by establishing a return wire for the current, instead of allowing it to return by the ground. Such an improvement will involve heavy expense, but as electric roads multiply, it is the only practical remedy.

Utilizing Beet Residue and Sawdust.

The development of our infant beet-sugar industry (with its thirty factories that produced 371,000 tons of sugar last year, valued at nearly \$8,000,000) raises the question as to the best means of utilizing the residue of the beets, which, in the European factories, is called "melasse." In the last decade, commencing with August, 1890, the world's production of cane sugar was 2,850,000 tons, against 5,950,000 tons of beet sugar. In the European factories, sugar to the extent of 12 to 13 per cent of the weight is extracted from the beets. Much of the melasse is converted into alcohol, while another method of using it is as an ingredient of animal food, especially in the so called "Torfmelassefutter," or peat and melasse mixed. The residue of the beets is said to contain about 50 per cent of uncrystallized raw sugar. The European demand for this class of animal food exceeds 75,000 tons yearly, at an average price of \$1.78 per cwt.

At the patent office in Berlin, an application is pending which provides for the utilization of sawdust in combination with melasse as a food for animals. This may savor the tale of the farmer who applied green goggles to his horse and fed him on sawdust, with the well-known result; yet the analytical table of nutritious matter contained in wood, that is appended to the patent application, is remarkable, when compared with that of straw. Chopped straw is used in Europe in considerable quantities to feed to animals in mixtures, and according to the analysis, prepared sawdust would be more nourishing than straw.

Detonating Device in France.

A French inventor has produced a successful apparatus for exploding dynamite with safety in coal mines where gas is present in dangerous volume, without the use of electricity, the installation of which is always costly and subject to disarrangement.

The instrument seems to cover the exposed end of the safety fuse, to fire it, and to receive all flame and sparks thrown off without allowing any communication with the atmosphere.

A copper tube receives the end of the fuse to a depth of several inches. At the other end of the tube is fixed a percussion cap, similar to those used in toy pistols, and lying against the side of the tube, which is pierced in its turn by a small hole. The distance between the extending end of the fuse and the percussion cap is only 2 millimeters (0.07 inch). The end of the tube with the percussion cap is introduced into another cylinder, also of copper, which contains the first mechanism. To operate the apparatus, the tube containing the fuse is held in the left hand, while with the palm of the right a smart blow is struck on the button of the percutient, when the cap explodes.

The gas produced by the fuse fills the cylinder, but can not escape outside, unless extinguished, as the holes in the cylinder are covered with metallic gauze. In practice, the tubes are prepared outside, in the daytime, by the lamp cleaner, so that no stray percussion caps may be brought into the mine.

Each foreman whose business it is to supervise the blasting takes into the mine a case containing the number of tubes required for the day, and brings them back at night to be recharged.

This simple apparatus has been in use for several months in the north of France. It is reported to be giving much satisfaction, being both economical and sure in its working.

Wireless Telegraphy of Long Ago.

Long before the dawn of the Christian era wireless methods of communicating intelligence to a distance were employed, not electric telegraphs as the term is generally understood, it is true, but wireless they certainly were.

Polybius, the Greek historian, describes a telegraph system employed for military purposes, 300 B. C., in which torches were placed on high walls in prearranged positions to correspond to letters of the Greek alphabet, and by a suitable manipulation of the torches messages were thus transmitted to a distance. The Gauls, too, were wont to transmit important intelligence to a distance by a cruder but simpler method. A messenger was sent to the top of a hill, where he shouted his message, apparently to the winds. Soon from afar a remote voice answered him, and this voice repeated the message to another listener further on, and thus, from one to another, the message sped, and it is recorded that in three days, a message calling all the tribes of the Gauls to arms travelled in this way from Auvergne to the forests of Amorica in one direction, and to the banks of the Rhine in another.

Later on came another wireless telegraph system,—the semaphore telegraph,—and this was in operation all over Europe prior to, and for some time after the introduction of the electric telegraph. This semaphore telegraph employed arms on posts akin to those seen to-day along every railway in the world, and a certain position of the arms, like the torches in the Polybius system, corresponded to certain letters of the alphabet, and by varying the position of the arms as required, experts were able to transmit messages from one station to the other at the rate of two or three words per minute. The towers on the top of which the semaphores were erected were often 50 to 60 feet high, and were placed on eminences about six or eight miles apart. In Russia alone there was a string of these towers from the Prussian frontier to St. Petersburg, a distance of 1200 miles or more.

Species of wireless telegraphy we may be pleased to term it,—is in use to-day by the peasantry in one of the Southern mountain sections of the

United States to warn the proprietors of illicit stills when the revenue officers are on the warpath. When they come in sight of a cabin, the tenant emerges with a tin horn and sounds a blast which is taken up at the next cabin, and so on along the trail to the heart of the mountains. There is nothing to seize when the raiders arrive at the suspected place, and when they retire, business is resumed.—*Wm. Maver, Jr., in Cassier's Magazine for January.*

Preventing Interference of Wireless Telegraph Messages.

At an early period of the practical history of the wireless Telegraphy it was seen that the usefulness of this art might be considerably curtailed by the fact that but one message could be transmitted between any two stations within the sphere or "radius" of influence of a transmitter, since the attempt to transmit even two messages at one time would result in an unintelligible mixture of both messages. Several inventors have been more recently at work trying to overcome this defect, and, it is claimed, with success, notably Dr. Lodge, Sig. Marconi and Dr. Slaby. The plan followed by these gentlemen has been that of employing a syntonic or tuning method; that is, the transmitting and receiving circuits are adjusted or "attuned" to a given rate of electrical oscillations.

It is a well-known experiment that when two tuning-forks, having an identical fundamental rate of vibrations, are placed in suitable proximity, either fork may be set into vibration by air waves set up by the other fork, and neither will be set into vibration by another fork of a different note. The tuning-fork is a persistent vibrator by virtue of two qualities which it possesses, elasticity¹ and inertia. When struck a smart blow, it moves from its point of rest; directly its elasticity returns it to its point of rest, its inertia carries it past that point, its elasticity returns it to zero point, inertia carries it past, and so on, until the resistance of the air and other causes stop it. Analogously, an electrical circuit may be given, in almost any desired proportion, the equivalents of mechanical inertia, elasticity and resistance, in inductance, capacity, and ohmic resistance, respectively; and the weight of electric oscillation of a circuit may be varied by varying these factors,—the smaller the factors, the higher the rate of oscillation.

When, then, the receiving circuit of a wireless telegraph system is accurately tuned to oscillate in harmony with the transmitting circuit, which can be done by giving the respective circuits practically equal inductance, capacity, and resistance, the receiving circuit will respond only to the oscillations set up by an transmitter correspondingly tuned. At least, this is, briefly, the theory on which these experiments are based. In experimenting, Marconi and others have, it is stated found that perfect syntony between the respective stations is not absolutely essential, but that if there is a marked divergence of frequency of oscillation between them, the receivers will not respond to any but their correspondingly attuned transmitters.—*Wm. Maver, Jr., in Cassier's Magazine for January.*

CLASSIFIED list of Patents issued during the month appears in each issue of the **INVENTIVE AGE**, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—The full address of any patentee, and number of patent found below sent to subscribers of this paper only, on receipt of one 2-cent stamp.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings upon receipt of 10 cents per copy; twenty copies for \$1.50.—Address **THE INVENTIVE AGE PUBLISHING CO.**, 918, F St. N. W. WASHINGTON, D. C.

(Continued from December Number.)

Tires. Device for equipping vehicle wheels with rubber.....A. W. Grant
Tobacco smoking pipe.....C. L. Wilson
Tobacco truck.....W. C. Moore et al
Traction device. Adjustable.....J. H. Kirkpatrick
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Well drilling apparatus.....F. W. Bushner
Well sand reel. Artesian.....H. W. Eaton, Jr et al
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Furnace.....W. B. Estes
Game.....H. Procopee
Gang plank.....W. F. Uphoff
Garment fastener.....A. J. Bradley
Gas and air mixer.....B. Murray
Gas compressing apparatus.....W. T. Sugg
Gas generator. Acetylene.....P. E. Ward
Gas generator. Acetylene.....L. A. Boyer
Gas generator. Acetylene 3 pats.....T. A. Bryan
Gas governor. Automatic.....H. H. Kayer
Gas meter. Dry.....A. Schofield
Gas producer.....R. L. Morgan
Gate.....T. J. Alsop
Gate.....W. H. Thayer
Gear coupling. Universal.....J. D. Artz
Gear generating cutters. Machine for grinding.....E. R. Fellows
Gear. Variable speed.....J. M. Ough et al
Glass articles. Machine for the manufacture of pressed.....G. H. Gray
Glassware. Apparatus for manufacturing articles.....F. R. Gillinder
Glassware into and through annealing ovens. Apparatus for conveying.....H. H. Bridgewater et al
Glove.....I. J. Bradshaw
Golf apparatus.....E. Crowe
Golf club bag support.....J. P. Goodbun
Governor. Pressure.....D. Donohue
Governor. Speed.....F. H. Cheyne
Grain separator.....W. S. Currier
Grater. Vegetable.....J. F. Rote
Hammer. Power.....M. Erickson
Handcuff.....L. F. Maltby
Hand protector.....R. A. Ritchie
Harness.....P. O'Leary et al
Harness ornament.....R. C. Becher
Harrow and cultivator. Combination.....A. A. Aillingslea
Hat bodies. Apparatus for treating felt.....C. E. Keator
Hat brim curling machine.....R. G. & Segsneider
Hats. Manufacture of felt.....C. E. Keator
Hay or cotton press.....R. Hamilton
Heating apparatus.....W. Dawson
Heating system. Steam.....J. A. Trane
Hedge frame. Salvage.....T. D. Wilmarth
Hill compressing machine.....D. C. Beck
Hinge.....J. R. Carter et al
Hinge.....W. Gosset
Hog dressing rack.....N. Voigt
Horseshoe. Adjustable.....G. S. Vogt
Hydraulic press.....A. H. Ketcham
Ice perforator. Shaved.....E. G. De Ry
Impact motor.....C. Hahn
Inhaler.....W. B. Dewees
Initiating apparatus.....C. B. Post
Injector. Hypodermic.....W. M. Haynes
Insulating support for electric wires.....R. G. Hemingray
Invalid lifting and moving device.....H. Sommerfeld
Knot. Alarm door.....F. J. Gustine
Knob attachment.....H. C. Pruce
Label holder.....F. B. & M. S. Grove
Lamp. Miner's.....M. F. Hammond
Lamps. Hanger board for series arc.....F. O. Lundin
Leather. Grain.....M. Planko
Leather stretching device.....J. Caldwell
Lens grinding machine.....E. M. Long
Letter box. Post office.....P. Schulze
Letter sheet and envelop. Combined.....A. Collins
Level. Extensible.....G. W. Smiddy et al
Lever. Lifting.....L. E. Waterman
Life preserver.....E. S. Magnin
Life preserver.....E. Krage
Lifting device for flanged article.....M. C. Nier
Lifting jack.....W. H. Cox
Load retaining apparatus. Vehicle.....W. M. Cain
Loom shuttle.....D. Sussman
Loom warp stop detector.....H. Wynman
Loom wary stop motion.....A. E. Stafford
Low or high water alarm.....R. C. Blake
Magnetic separator.....T. J. Greenway
Mail bag crane.....W. W. Shea
Mail bag holder and deliverer.....A. J. Pennington
Mail box attachment.....J. L. Plank
Malt turning apparatus. Green.....F. Singer
Manganese. Preparing an acetylene preparation of.....T. Macalpine
Mangle. Steam.....J. W. Casper et al
Manual motor.....G. A. Thode
Manure gatherer and loader.....J. Peterson
Marking device.....W. R. Mosre
Massage glove.....R. E. Safford
Match box friction attachment.....C. J. W. James
Measuring instrument.....E. Hill
Metal rods. Die for drawing.....G. E. Thackray
Metal working machine attachment.....R. B. Perrot
Metals. Apparatus for electrocoppering.....E. L. Dessolle
Metals. minerals, ores, &c. Apparatus for

locating.....A. F. McClatchey
Micrometer gage. Telescopic.....T. Wiedemann
Microscopes. Mechanical stage for.....A. F. Martins
Mining machine. Subaqueous.....S. C. Monberg
Mixing machine. Portable mortar, concrete, or like.....A. Wilcox
Mowing machine.....G. W. Hinchman
Music box.....G. Varrelman
Music spool. Perforated.....H. H. Mansfield
Musical instruments. Mechanism for operating muffers on.....W. C. Bosenbury
Musical instruments. Pneumatic key striker for mechanical.....H. M. Salyer
Nail coating.....J. A. Henderson
Nail puller.....J. B. Salo
Needle making machine.....E. Fontaine
Nut. Lock.....W. N. Mecklan
Nut lock.....T. Beach et al
Oiling overhead cables. Means for.....C. Larsen
Ore separator.....J. Conley
Pail ho der. Milk.....W. S. Sherd
Paper box. Circular or elliptical knockdown.....G. V. Russell
Paper. Copying.....J. F. Lester
Paper folding machine.....H. K. King
Paper folding machine.....H. F. Bechman
Paper size. Producing.....J. Wezel
Peeling machine. Potato.....J. Blache
Pen. Fountain marking.....F. X. Koempel
Perforating machine for tapes of paper, &c.....F. G. Creed
Phonograph.....F. Myers
Photographic vignetting apparatus.....W. Anderson
Pianos. Mechanism for adjusting music desks on.....W. C. Bosenbury
Piles. Protecting.....F. Gold
Pipe coupling.....A. N. Wilson
Pipe joint. Expansion.....O. N. Evans
Pipe threading machine.....B. Borden
Planing machine.....J. R. Thomas
Plaque hanger.....J. Frenzel
Plow attachment.....C. Haynes
Plow. Reversible.....T. A. Jackson
Plow. Stirring.....J. Specht
Pneumatic despatch tube carrier.....A. W. Pearsall
Preserving foods.....J. F. McNaney
Printing. Lithographic.....F. Billing
Printing machine paste fountain.....2 pats.....G. F. Read
Printing machine tripping mechanism. Cylinder.....J. White
Printing press.....J. F. Ames
Projectile.....A. J. Robertson
Pump. Stomach.....W. Gerry
Radiator. Wrought metal.....F. A. Wilmot
Railway. Electric.....2 pats.....L. Woods
Railway sign al.....G. W. Harris
Railway. Single line.....H. Fisher-Spenser
Railway ties. Forming.....D. G. Ross
Railways. Third rail safety system for electric.....C. Schlechtiger et al
Razor stropping machine.....A. L. Silberstein
Razors. Holder for stropping safety.....J. A. Butler
Refractory materials. Manufacture of.....R. J. Friswell
Refrigerating and ventilating apparatus.....O. P. Ostergren
Refrigerating system. Car.....J. O. Morris
Rein holder.....C. P. Uhlmann
Riveting machine.....W. Sellers et al
Rock drill.....H. D. Crippen et al
Roll holder.....H. McKay
Rolling metal. Hotbed for.....A. J. Demmler
Roof collar.....M. L. McGuire
Bope machine.....O. Bucklin
Rotary engine.....F. R. Strunk
Rotary engine.....H. E. Smallbone
Rotary motor.....W. Deiwiks
Rudder chains of ships. Yielding guide roller for.....A. May
Sad iron.....W. E. Hyt
Sash cord guide.....R. M. Elliott
Sash fastener.....E. Schindler
Sash fastener.....W. S. James
Saw.....W. T. George
Saw. Hack.....E. R. Fellows
Sawmill carriage offset.....A. Cunningham
Saw set.....C. Morrill
Saw swage.....C. H. Van Anken
Scholar's companion.....J. Beery
Screen plate holder.....F. W. Brawn et al
Screw coupling.....4 pats.....J. M. Cox
Screw tap, &c.....H. W. A. Fette
Seal. Car.....C. W. Richards
Seals for envelopes. Device for applying metallic.....J. W. Cushman
Sealing cap. Vessel.....A. A. Low
Sealing means for vessels.....A. A. Low
Serums. Device for storing and administering.....H. F. Prescott
Sewing machine. Broom.....A. E. Miller
Sewing machine. Double zigzag.....H. A. Klemm
Sewing machine presser foot holder.....J. M. Greist
Sewing machine ruffler.....A. Johnston
Sewing machine stitch separating mechanism.....H. C. Peters
Shade bracket. Adjustable window.....A. H. Chellis
Shade roller and curtain pole bracket. Combined.....J. Joubert, Jr
Shade trimming device.....H. C. Chaffee
Shaft coupling and antirattler.....R. H. Hearn
Shaft support and antirattler. Combined.....G. S. Johnson
Shaft. Vehicle.....T. J. Waddell
Shaving cup.....S. W. Babbitt
Shearing knife. Spiral.....F. Schletter
Sheep dipping composition.....R. Mackill
Ship's port hole.....J. D. Hannah
Shoe horn.....B. F. Duval
Shoe case.....C. F. Murray
Show case fixture. Electric.....E. A. Lowe
Sifting device.....J. H. Cope
Signature gathering machine.....H. L. Roberts
Skirt.....L. G. Fick
Soda water apparatus.....C. A. Geddes
Soda water dispensing apparatus.....W. Helmer
Soda water dispensing apparatus.....L. Tuit et al

Spark arrester. A. E. Hess
Speed changing and reversing gear. H. E. Brown
Spinning spindle. W. F. Draper
Spike tenoning and cut off machine. C. Seymour
Stacker. Hay. J. F. Hazel
Stacker. Hay or grain. R. D. McKee
Stall floor. W. F. L. Spengler
Stamp. Adjustable hand. J. A. Crandall
Stamp. Time. J. G. Hallas
Station indicator. O. B. Thompson
Steam boiler. Electrical. C. E. Griffing
Steam engine. G. B. Smith
Steam generator. R. Damonte
Steaming apparatus for the head. M. J. Fitzgerald
Stone. Making artificial. P. J. Prior
Stove. Cooking. A. Ghenemus
Sugar. Drying. F. Mahoudeau
Surgical safety appliance. A. W. Ready
Suspender attachment. A. L. Nelson
Swinging chair and crib. Combined. G. L. Powell
Tackle block. A. E. Taylor
Teleph. ne apparatus. E. W. Hazazer
Telephone cabinet. E. W. Smith
Telephone circuits. Service meter apparatus for. E. C. Robes
Telephone receiver. W. F. Taylor
Telephone switchboard system. F. W. Dunbar
Tension coupling and sound deadener. Automatic. E. L. Grauel et al
Thread. Device for stripping wax from. J. B. Dobyne
Thread waxing device. J. Keats
Tie fastener. E. F. Priddat
Tile making machine. A. J. Hoban
Time alarm. H. Lewis
Tire. Bicycle. B. Broughton
Tire for bicycles. Self-inflating. C. G. Morgan
Tires to wheels. Means for securing elastic. J. A. Swinehart et al
Tool holding device. M. Dunn
Torch for lighting gas lamps. J. F. Simmance et al
Torpedo. Marine. G. Ansaldo
Towel cabinet. Roller. F. H. Curtis
Trap. C. M. Shafer
Trimming. F. A. Kirscheidt
Trolley wire hanger. G. W. Gurten
Trousers former. A. W. Ewers
Truck center plate. Car. J. C. Barber
Truck side bearing. J. S. Pearce
Truck side bearing. Car. F. B. Aglar et al
Trunk. (reissue). W. Hossfeld
Tube connection. E. S. Leaycraft
Tubes, pipes, &c. Apparatus for manufacturing. R. Thompson
Tubular ball mill. T. T. Lindhard
Tufting board. C. F. Streit
Tufting frame. P. A. Neider
Turpentine hack and shave. J. P. Council, Jr
Twisting machine feed mechanism. P. Hardman
Type writing and computing machine. Combined. H. Marshall
Type writing machine. W. J. Barron
Type writing machine. 2 pats. B. C. Stuckney
Type writing machine. E. B. Hess et al
Umbrella. Self-opening. R. Schoenberg et al
Valve. Automatic shut off. N. C. Locke
Vapor burner. Incandescent. J. A. Pitt
Vehicle antirattler. T. Y. Pamplin
Vehicle brake mechanism. W. Winkler
Vehicle driving gear. Motor. H. Spurrier, Jr
Vehicle jump seat. G. H. Hutton, Jr
Vehicle motor attachment. Road. H. J. Lawson
Vehicle seat. Two wheeled. P. A. Millard
Vehicle steering gear. P. H. White
Vehicle wheel. G. S. Lee
Vending machine. Coin controlled. W. H. Garland
Vessel floating apparatus. A. S. Debose
Vise. C. N. Grace
Wagon or other vehicle. J. B. Rhodes
Water. Chemical compound for treating. W. F. Eger
Water closet tank. J. J. G. Crosby
Water level in reservoirs. Apparatus for maintaining the. G. I. Rockwood
Water meter. E. M. Hackett
Water meter. Reciprocating. C. L. Wilkins
Wave motor. M. Gehre
Weather strip for doors. Automatic and reversible sheet metal. C. A. Armantrout
Web folding machine. A. V. Walker
Weighing machine. Automatic. J. B. Schuman
Wells. Automatic casing perforator for deep. E. A. Hardison
Wheel rim finishing machine. Automatic. C. Seymour
Wheelbarrow. G. C. Gane et al
Wheelbarrow. O. Hoffmann
Wheelbarrow frame. F. J. Cooper
Winding machine. Robbin. F. A. Brackett
Winding mechanism for wraps or threads. W. B. White et al
Wood and making same. Waterproofed. H. R. Brinkerhoff
Wrench. G. W. Booser
Yoke. Neck. J. C. Buzard et al

DESIGNS.

Book edge protector. C. Chivers
Broom holder member. F. W. Pendergast
Display box. T. F. Curley
Gas vaporizing frame. C. V. Best
Hammer. H. MacDerott
Mustache guard. J. W. Brayman
Sash ventilator. Window. S. W. Sherman
Thermometer mounting. 2 pats. G. E. Taylor
Trace fastener. R. H. Berkstresser

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MECHANICAL PATENTS.

Air brake coupling. G. H. Balentine
Air compressor. J. P. Tryner
Air compressor relief governor. G. F. Steedman
Air motor. C. L. Davis
Alcohol from empty barrels. Recovering absorbed. C. J. Seltzer
Antihunting device. A. D. Lunt
Ax. A. Erickson
Axle box dust guard. Car. S. A. Crone
Bag. B. Arkell

Bag. G. P. O. Heroux
Bag holder. K. D. Thompson
Bag lock. Money. H. E. Nason
Bag or sack. W. N. Green
Barrel heading machine. J. W. Angus
Barrel swing. J. R. Barnes
Battery separator. Storage. R. N. Chamberlain
Bearing for centrifugal apparatus. Cushedion. O. Ohlsson
Bed. Invalid. W. A. Nason
Belt or strap splicer. R. E. Cain
Bicycle lock. C. H. Scher
Bird trap. J. B. Barry
Blocks, briquets, &c. Manufacture of. E. Traier
Blowpipe. D. C. Patterson
Boiler. A. H. Macarthy
Boiler setting and support. H. L. Van Zile
Boiler water indicator and recorder. Steam. D. Moore
Boilers. Stay for fire boxes in locomotive, marine, or other. F. W. Stroudley
Bolts. Machinery for manufacturing. J. Bartoski
Bonding plug. W. S. Jones
Boring and drilling machine. B. E. Hervey
Bottle. J. W. Jackson
Bottle. Siphon. D. Landau
Bottle stoppering machine. J. & J. A. Butkus
Box. M. L. Hirsch
Box hook. B. D. Druen
Bracket. J. E. Chapman
Brick and the furring of facing for walls. Combined. D. W. Anderson
Brick for making structures fireproof. D. W. Anderson
Brick or combined brick and tile. D. W. Anderson
Bridle blinder. C. Bear
Brush. Shoe. W. T. Braxton
Brush Tooth. C. W. Richards
Bucket. E. Huston
Buckle. F. Rees
Buckle. G. N. Clark
Buckram fabric. Woven. H. H. Shamway
Button attaching machine. (Reissue). F. R. white
Button fastener. H. G. C. Horning
Buttoning device. Collar. G. S. Dolloff
Cabinet for roll goods. Storage, measuring, and rolling. F. E. Myers
Camera. Roll. J. A. Pantasso
Camera support. Tripod. C. Weatham
Cameras, &c. Adjusting device for. E. O. Kolander
Can fastening. C. E. Humm
Can making machine. W. H. H. Stevenson
Cane carrier and feeder. H. Wicks
Car. B. Bulkeley
Car coupling. W. A. Palmer
Car door. E. S. Barreiras
Car. Dump. J. B. Rhodes
Car fender. C. H. Hefemister
Car seat. E. T. McKaig
Car. Steel. F. H. Knul
Car tramway. Street. F. B. Anderson
Car wheel. Mine. F. C. Hockensmith
Cars. Swinging door for freight. E. J. Miller et al
Cars. System of electrical propulsion for railway or other. G. J. Scott
Carpet fastener. G. L. Webb
Cart. J. C. Henderson
Casting box. L. Grossman
Casting mold. Metal. C. S. Price et al
Cattle guard. A. I. Shaw
Cement kiln. J. D. Swindell
Centrifugal machine. S. A. Baker
Chain. Driving. J. S. Kidd
Chataleine. C. Blust
Cherries, &c. Machine for removing stones from. W. P. Harris
Chuck. Automatic drilling and tapping. T. Wiedemann
Churn. N. Monday
Churn. E. R. Deming
Churn. C. Franklin
Cigarette machine cutting mechanism. J. Mahony
Circuit breaker. R. H. Read
Circuit breaker. Automatic. H. P. Ball
Clay ballast. Apparatus for use in producing burnt. G. M. Beni et al
Clevis. M. Pyle
Clip. T. K. Davison
Clothes line attachment. W. W. Pumyea
Clothes wringer. T. Heffeman
Clutch. Friction. M. Campbell
Coffee pot. H. Ricker
Coloring matters for lustre ware. G. Alefeld
Combination seat. I. N. Stark
Conduits. Cushing for interior. W. F. Bossert et al
Cooler. C. Zimmerman
Coop. Exhibition. E. S. Freeman
Cork puller. J. J. Schermack
Corn receiving and carrying device. C. Burnett
Corner post and joint. J. E. & C. B. Brown
Corrugated tube. J. Macphail
Cotton openers. Evening device for. F. H. L. James
Cultivator. A. C. Lindgren
Cup or plate holder. E. K. Hallenberg
Curling tongs heating apparatus. H. Aempe
Current system. Alternating. C. P. Steinmetz
Current transformer. A. R. Everest
Curtain fixture. M. A. Gaugh
Curtain pole fixture. C. R. Bell
Curtain stretcher. F. T. Griffin
Crystallization. K. Lietzer
Cyanamids. Making. J. Pfleger
Cyanids. Making. J. Pfleger
Dampers. Stove. G. V. Williams
Die press. A. W. & A. H. Rooves
Die press. Coin controlled. A. W. & A. H. Rooves
Dimethylamidodimethylphenylprazolol and making same. Acid compound of. A. Ammelburg
Dimethylamidodimethylphenylprazolol and making same. Neutral compound of. A. Ammelburg
Disinfectant. Making a. W. T. Kendrick et al
Disinfecting and hair drying apparatus. H. Sonnen
Distance instrument. G. M. Searle et al
Diving dress. F. H. Spraug
Door fastener. Sliding. J. T. Hicks
Door hanger. A. Rochwite

Door hanger. W. B. Smith
Dough divider. F. H. Van Houten
Draht connection. A. T. Wentworth
Drain trap. G. A. Schilliger
Drawer hanger. Bureau or other. C. A. Snook
Drier. F. I. Post et al
Dye and making same. Brown sulfur. M. Schumann
Dye and making same. Disazo. M. Ulrich et al
Easel support and hanger for picture frames. Combined. C. D. Golden
Electric battery. E. F. Callender
Electric circuit system. F. E. Case
Electric conducting cable. J. D. Peachey
Electric furnace. M. Ruthenburg
Electric machine brush holder. Dynamo. G. Heidel
Electric machine. Dynamo. W. Langdon et al
Electric seymotor. P. M. Le Hegarat
Electrical distribution system. A. R. Everest
Elevator door locking mechanism. J. S. Muckle
Elevator indicating mechanism. A. H. Bates
Embroidering machines. Automatic stop mechanism for. C. B. Neubauer
Engine starting device. Explosive. W. L. Walton
Engines and condensers. Safety device for. T. Grieve
Envelop opener. 2 pats. H. H. Bowerman
Evaporator. J. E. Kohn
Exhibiting device. Card. F. M. Clark
Explosive engine. A. Tourand
Explosive engine. H. Enge
Eyelet coating machine. I. W. Gues
Eyeletting machine. 3 pats. P. R. Glass
Faucet operating device. W. M. Powers
Feeder. Boiler. J. H. Davis
Fence machine. Wire. W. N. Parrish
Fence making apparatus. J. D. Martin
Fence. Wire. E. L. Ewbank
Fences. Metal post for wire. E. Wheeler
Fertilizers. Making. M. M. Lipps
Fire escape. J. Michaelson
Fire escape. H. O. Case
Fire extinguisher. A. C. Badge
Fire extinguisher systems. Valve for automatic. C. L. Fortier
Fire proof blind and door. W. R. & R. H. Kinnear
Fish dressing machine. A. W. Funk
Flaying knife. R. Appeal
Fluid controller. W. S. Shields
Flush bolt. H. G. Karrenberg
Flushing mechanism for closets, &c. J. Douglas
Folding brace. L. B. Jelfcott
Folding case. J. T. Cathcart
Folding table. E. J. Thomas, Jr
Form. E. H. Wright
Fruit drying apparatus. M. A. Smith
Furnace air feeding device. C. R. Litter
Furnace door frame. N. McConnell
Game. Puzzle. W. K. Hawks
Garbage can receptacle. F. Riley
Garment fastening. A. Osterwald
Garment hanger. P. F. Denning
Garment book. J. W. Granger
Garment press. J. T. Beall
Garment supporter. J. W. Conboy
Garment supporter or fastener. L. Ackerman
Garment supporting clasp. J. F. Atwood
Gas, air, &c. Apparatus for compressing. C. S. Snell
Gas burner. W. R. Klobb
Gas generator. Acetylene. E. R. Angell
Gas generator. Acetylene. L. J. Bamberg
Gas meter valve. J. Seymour
Gas or vapor burner. Hydrocarbon. D. W. Bowman
Gas purifying box. W. A. Learned
Gear. Driving. L. Hausmann
Gear. Frictional driving. J. F. Truitt
Gearing. Mechanical. L. S. Fleckenstein
Gearing. Variable. 3 pats. C. Upson
Glass blowing machine. H. W. Heerd
Glass bottles, &c. Apparatus for the manufacture of. W. Drake
Glass objects of waste glass. Making. E. Geille
Glove drier. J. P. Becker
Glucose. Manufacturing. L. C. A. Calmette
Governor attachment. Engine. J. D. Liddell
Grain binder. J. Macphail
Grain binder knotting device. R. F. Miller
Grain drying apparatus. M. Konig
Grain separator and cleaner. D. Lippy
Grapple. E. R. Quinn
Grapple device. P. E. Houlihan
Grinding machine. J. Macphail
Grinding or polishing machine. M. Seiberling
Grinding wood, &c. Machine for. N. Heid
Gun. Automatic or other machine. A. T. Dawson et al
Gun carriage. Field. G. S. Clarke
Hammock and swing support. Combined. J. Handyside
Harrow attachment. J. L. Scndder
Harrow tooth fastening. J. J. Callender
Harvester. Corn. E. M. Kellogg
Hat show case. Revolving. R. W. Brown
Heat distributor. A. Herig
Heater. 2 pats. J. Damey et al
Heating devices or systems. Regulating. C. G. Armstrong
Heating furnace. D. S. Richardson
Heating furnace. T. H. Priest
Heels. Manufacturing shoe. H. Hellweg
Hoe. Weeding and thinning. A. T. Fischer
Hook and eye. F. W. France
Horseshoe. J. H. Schroeder
Horseshoe. J. L. F. C. Kober
Horseshoe p.d. D. W. Maloney et al
Hot air bath. F. C. Dithley
Hot water bag. F. E. Crawford
Hub for cycle or other wheels. Pneumatic. H. P. Rasmussen et al
Incubator. A. Duensing
Indicating instrument. T. F. Mullaney
Inks on manuscripts. Electrical heater for developing and fixing. E. M. Thompson
Insulating material. J. De Long
Insulating tubes. Machine for making. C. H. Palmer et al
Internal combustion engine. L. Genty
Iron. Making granulated cast. C. C. G. R. Bachmann
Ironing table. Foldable. J. A. Golden
Jar or bottle closure. J. M. Grenier
Joiner's clamp. E. Cramer

Knife. H. S. Carley
Knit goods. Producing. B. T. Steber
Knitting machine. G. W. Cummings
Knockdown box or cards. J. O. Boyd
Ladder. W. C. & F. H. Warren
Ladder. Berth. D. MacLean
Lamp regulator. Incandescent. F. C. Schofield
Lamp securing mechanism. W. D. Zimmerman et al
Last. Shoe. F. E. Benton
Lathe backing off mechanism. E. M. Griffiths et al
Leather stretching device. 2 pats. J. C. Baswell
Life saving appliance. C. Baswell
Line clasp. A. W. P. Malins
Lintel. W. F. Pelton
Lock. H. Barry
Loom and filling carrier therefor. Filling replenishing. H. Cote
Loom and filling carrier therefor. Filling replenishing feeler. J. Northrop
Loom filling replenishing mechanism. J. Northrop
Loom jacquard apparatus. H. Hardwick
Loom. Pile fabric. G. F. Hutchins
Lubricating device. Reissue. O. Newhouse
Lubricating pistons and slides of locomotives. Means for. F. Wagner
Machine tools. Variable feed mechanism for work tables of. T. Schwarz
Magnesia carbonate. Making. W. Marsh
Magnetic separator. H. M. Daggett
Magnetic separator. R. McKnight
Magnetic separator for ore or concentrates. M. Ruthenburg
Mail bag catcher and deliverer. B. Chamberlain
Mail box. J. O. Adams
Mail crane. Automatic. G. A. Bailey
Match safe. R. F. cage
Measuring device for distance instruments. G. M. Searle et al
Measuring vessel. S. D. Fry
Medical treatment. Electric generator and distributor for. E. L. Madden
Metal pipes or tubing. Machine for treating. C. N. Brown
Mica. Building up sheets of. R. W. Heard et al
Mica. Separating laminae of. R. W. Heard et al
Motion at variable speed. Apparatus or gear for transmitting. A. Wache et al
Motor. W. A. Macker
Motor control system. C. L. Perry
Motor control system. P. Farnsworth
Motors. Adjusting device for electric igniters for explosive. C. T. Jeffery
Musical instrument. Stringed. T. Wolfram
Nasal cup. W. J. Evans
Net, &c. Machine for spotting. E. L. Thorp
Numbering machine. C. G. Harris et al
Oil burner. A. J. Blackford
Oiling device. Automatic. J. D. McFarland, Jr
Ore separating machine. S. R. Krom
Package. G. L. Zucker
Packing and display box. C. A. Lindsay
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Padlock. W. R. Ballou
Pail or bucket. C. E. Bertels
Paper fabric. B. Arkell
Paper. Making crinkled. B. Arkell
Party fire selector system. T. C. Drake
Pattern cutting machine. C. E. Reed
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Pen. Fountain. J. F. Benzler
Pen. Fountain ruling. H. P. Havens
Phonograph record box. J. R. Hare
Photographs in natural colors. Apparatus for taking and exhibiting. L. D. du Hauron
Photography. Producing plastic articles by the aid of. M. R. d'Asar
Photometer. A. H. Munsell
Pickling bath. C. P. Byrnes
Pictorial device. J. A. Imhof
Picture exhibitor. L. Breton
Pitting machine. O. M. Wolff
Plane. Divided. reissue. H. A. Verge
Planter. Corn or cotton. C. L. Ferriott
Plow. F. J. Lehnert
Plow subsoil attachment. B. W. Bryant
Pole cap. Wagon. E. C. Rassel
Post office box indicating mechanism. T. F. Kelly
Power. Coupling for transmission of. S. J. Heine
Press. S. J. Webb
Pressure regulator. A. W. Cash
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Printing machine. Cylinder. J. W. Hunter
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Pulp screen. Centrifugal. J. H. Baker et al
Pump. J. Horn
Pump. Oil. C. F. Rigby
Punch press. M. Gnett
Rail bond. C. Walther
Rail joint. O. P. Anderson
Rail joint. J. A. Thompson
Railway and railway security. J. N. Young
Railway brake. reissue. A. Green
Railway crossing signal. B. A. Karr
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Railway signaling device. L. C. Karr
Railway switch lock. C. P. Kn x
Ratchet wrench. W. Eggert
Razor stropping device. Safety. F. R. & O. Hampfe
Reel bat and means for securing same. J. Macphail
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Refrigerator. E. Maddox
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Register. W. A. Foss
Regulator. R. Fleming
Rheostat. F. Mackintosh
Rivet. Tubular. W. C. & M. N. Bray
Riveting machine. Hydraulic. W. H. Derbyshire
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Rope clamp. F. C. Crowe
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Rubber mat. Multicolor. F. N. Upham
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Safe door locking device.....H. C. Stockwell
Salt making apparatus.....L. J. Bureau
Sanitary closet or safe.....E. E. Ashley
Sash lock.....W. F. Fister
Saw blades. Device for securing handles to.....E. Morris
Saw. Butcher's.....R. E. Martin
Scythe swath bending frame.....G. M. Penn
Seal lock.....H. A. Rotermund
Sewing machine. Harness loop.....J. N. Whipple
Sewing machine quilting frame.....J. W. Clayton
Sewing machine trimmer.....J. C. Goodwin
Shade machine. Window.....F. L. Fisher
Sharpener. Lawn mower.....E. P. Rogers
Sharpening machine. Drill bit.....T. H. Proske
Sharpening scissors or shears. Device for.....A. L. Tolman
Sheet metal plates. Machine for separating.....T. Westwood
Sheet metal wheel.....J. Macphail
Shock loader.....T. Carrey
Shingle tree hook. Locking.....2 pats.....J. Lewis
Skate.....K. Kiss, Jr
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Snow guard. Wire.....S. T. Naskashjian
Speed indicating and recording apparatus.....N. C. E. Flaman
Speed regulator.....C. F. Sleigh
Spindle plumb.....H. Kelly
Spinning frame.....A. E. Rhoades
Spinning textile materials. Roller employed in.....G. A. Ryder et al
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Stacker. Pneumatic straw.....C. E. Locke
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Steam or hot water generator.....W. Kane
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Stove.....J. L. Ritter
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Switch throwing device.....C. Carpenter
Switch valve controlling mechanism.....E. G. Harris
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Telephone system. Automatic.....E. A. Faller
Telephone toll collecting machine.....W. A. Foss
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Tire. Rubber vehicle.....R. B. Price
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Tire. Wheel.....H. Lieberthal
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Toy. Mechanical.....C. R. Scholl
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Train safety appliance.....J. V. Velasco
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Tumbler cleaning apparatus.....O. P. Mason
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Type writing machine.....C. H. Shepard
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Vehicle running gear.....W. E. Bemis
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Wagon box and hay rack. Knockdown.....E. R. Maine
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Water bag stopper holder.....D. B. Martin
Water flue boiler. Vertical.....J. Urquhart, Sr
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Well bailer.....W. Plotts
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Bath tub.....P. H. Pendergast
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Lorgnette case.....2 pats.....H. L. Grasmuk
Nut locking washer.....F. J. Clifton
Puzzle board.....O. J. Allenbaugh
Radiator valve casing.....D. F. Morgan
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Scarf.....D. Mayer
Stove top centerpiece.....A. B. Clunies
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Thermometer mounting.....G. E. Taylor
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Brakes. Electric releasing apparatus for pneumatic pressure.....A. Bruggemann
Buggy curtain.....J. C. O'Donnell
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Fuel. Manufacture of artificial.....A. E. Tucker
Fuel tank and means for filling same.....R. L. Morgan
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Nails. Apparatus for controlling and driving.....J. Hyslop
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Scale. Computing... S. Bengston
Scale lever loop... J. A. Barclay
Scholar's companion... A. W. Trescott
Scoop. Earth... W. Mathews
Scraper for road rollers... M. D. Doyle
Screw driver... C. M. Morse
Seal. Car... E. E. Mead
Seal for bottles. Lock... W. T. Kosinski
Sewing machine looper... W. M. A. Ammerman
Sewing machine needle stopping mechanism... F. W. Ostrom
Sewing machine oil guard... C. C. Richardson
Sewing machine take up... P. Diehl
Sewing machine take up. reissue... S. Williams
Shaft coupling... E. E. Hendrick
Shaft coupling... W. B. Culver
Shaft key. Self fastening... 2 pats. M. P. Boss
Shaft support and rein holder. Combined... J. D. McCabe
Sheeting fabric. Woven... G. P. Taylor
Shell... C. Davis
Shingling bracket... F. L. Spring
Shoe jack clamp... E. F. Winkley
Shoemaker's repair jack... D. Rounds
Skate strap... W. H. Gay
Smoke consuming furnace... G. Schneider
Smoke in furnaces. Apparatus for consuming... S. Reboul
Snow plow... J. W. Russell
Sole channeling and rounding machine... L. Goddu
Speed. Appliance for predetermining... D. H. Hilton et al
Speed changing device... C. O. Johnson
Speed regulating device... C. O'Connor et al
Spindle... G. B. McCracken
Spinning cotton or other fibres... W. A. Phillips
Spinning frame... C. T. Hawley
Spoketenoning machine... C. Seymour
Spraying apparatus. Traveling... G. A. & R. F. Dunn
Springs. Reinforcing device for semi elliptic... C. Lindstrom
Square and bevel. Combined try and circle... D. Elrod
Stamp. Hand... A. M. Comstock
Station indicator... C. H. Dill
Station indicator and advertiser... C. H. Dill
Steam boiler... W. D. McNaul
Steam boiler... W. W. & F. N. Trevor
Steam boiler... C. M. Spencer
Steam boiler... R. H. Boots
Steam generator... C. J. A. Grille
Steam meter... M. Gehre
Steeplechase or hurdle fence... A. Pascocello
Still... A. Powers
Storage device... R. B. Ayres
Stove for heating purposes... D. W. Bowman
Stove or furnace... J. Wilson
Stove or oven door... W. A. Moore
Stove or range. Cooking... E. H. Waldron
Stovepipe joint. Reducing... J. R. Carter
Stoves, ranges, &c. Draft regulator for... M. E. Madra
Street light... A. E. Shaw et al
Stylophone... F. Myers
Sugar. Extracting... B. Schwerin
Suspenders... A. Atlas
Suspenders... G. E. Adams
Swath turning machine... T. M. Jarman
Switch throwing device... C. Carpenter
Syringe. Hypodermic... C. M. Barton
Syringe. Vaginal... W. L. Short
Tachometer... E. Place
Telegraph instrument resophone... F. W. Inden
Telegraph system. Wireless... reissue... H. Shoemaker
Telegraphs, &c Pole for... G. V. A. Conger

Telegraphy. Wireless... H. Shoemaker
Telephone transmitter... W. W. Dean
Telephonic apparatus... M. Gally
Thill coupling... S. Bartholomew
Ticket holder... R. A. Lewis
Timber or log buoy... H. G. Cady
Tire. Vehicle... W. K. Freeman
Tobacco casing and flavoring apparatus... P. H. Hawkins
Tool... J. Harris
Tool holder... F. S. Mitchell
Trace end support... G. R. Richardson
Tracks. Device for removing ice from... C. S. Johnson
Train control system... F. E. Case
Transom rod locking device... E. H. Kimball
Tray or table... R. Scholze
Tree support... A. A. Hoyt
Tripod... R. S. Stapleton
Trolley... G. E. Chapman et al
Trolley mounting... F. C. Greene
Truck. Box... A. C. Stebbins
Truck. Car... J. C. Barber
Tube flarer... J. T. Scott et al
Tubes. Die for making screw thread on... W. E. Sullivan
Tubular ball mill... M. J. Davison
Turbine... A. E. A. Riegel
Type writer type... P. Waked et al
Typewriting machine... J. Corr
Type writing machine... J. Felbel et al
Type writing machine attachment... H. C. Krause
Umbrella notch... M. C. Beck
Valve... C. A. Mardder
Valve and valve gear for blowing engines... E. Reynolds
Valve controller... G. J. Schoeffel et al
Valve. Cut-off... F. Seiffert
Valve-gear... J. A. Pierce
Valve. Relief... J. Courville
Valve. Rotary cut-off... D. E. Shipley
Valves. Float for controlling shut-off... W. E. Hinsdale
Varnish-applying machine... W. C. Kammerer et al
Vault-light... H. Held
Vehicle. Motors... W. A. Crowds
Vehicle seat. Portable... W. G. Lenderson
Vehicle wheel. Ball-bearing... W. J. Bray
Vending device. Automatic coil-actuated... J. Aarons
Veterinary float... C. E. Clare
Viscosimeter... J. R. Reilly
Voting machine... D. Davis et al
Wagon. Coal... G. H. Gilbert
Wagon. Dump... J. Somerville
Warping-machine... J. B. Whitney
Washing machines. Means for operating... J. H. Buegge
Water heater... R. Beaumont
Waterproofing fabrics. Composition for... H. D. Heather
Water-tube boiler... R. Shulz
Web feeding and compensating mechanism for travelling-cylinder presses... G. F. Reed
Weed-destroyer... W. Gaterman
Window. Louver... J. W. Walker
Window protective device... W. H. C. Matthies
Window screen... C. Nemetz
Wire-cable clamp... G. F. Bell
Wire electric conductors. Apparatus for coating... W. S. Clark et al
Wire-stay lock plate... N. B. Leslie

DESIGNS

Bottle or similar article... H. G. Roth
Cabinet. Kitchen... A. I. Gaumer
Chair seat... W. Braasch
Chair seat spider... J. M. Gernanson
Cigar... S. Levin
Coat hanger... N. C. Oddo
Coudiment box... B. Crawford
Earthenware plate or similar article... R. Allen
Electric switch contact post... H. E. Nichols
Engine frame... H. L. Dodson
Fabric... G. H. Buckland
Fabric. Ornamental... J. Kaufmann
Fence wire. Barbed... 3 pats. D. C. Smith
Gas burner... W. H. S. Hamilton
Glass vessel... H. Richman
Hat... J. H. Crown
Horseshoe calk... R. Whitaker
Ice or hot water bag... C. W. Meinecke
Knitted undergarment... J. C. Lowrey
Lacing stud blank... J. C. Telfer
Lamp, Electric... C. Murray et al
Lorgnette case... H. L. Grasmuk
Massaging device... P. E. Wirt
Music leaf turner frame... F. Lawton
Pipe repair sleeve member... R. M. Kellogg
Register frame. Hot air and ventilating... C. H. Boeck
Rubber shoe... H. C. Mason
Saddle. Riding... F. M. Gilham
Saddletree... J. F. Meigs et al
Spectacle case or similar article... J. W. Jarvis
Speculum blade blank... E. J. Pilling
Spoons, &c. Handle for... C. H. Burdick
Sprinkling bulb... F. C. Luff
Tag fastener... J. M. Roth
Tie shield... G. E. Figg
Tools. Casing for fluid pressure operated... J. Keller
Toy bells. Action wheel for... F. E. Clark
Toy spade handle member... H. T. Kingsbury
Type. Font of... N. Nadall
Type writer frame... J. Alexander
Weighing machine case... W. H. Pumphrey

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Abrasive wheel... D. B. Hyde
Acid. Producing chemically-pure hydrochloric... E. de Haen
Adjustable chair... G. W. Myers
Advertising apparatus... J. E. Houke
Air-brake... H. F. Noyes
Air-ship... J. Spies
Alkali and halogen gas. Production of caustic... C. E. Acker
Automobile... J. Fortner
Automobile controller. Electric... F. F. Loomis
Automobile steering gear and brake... F. F. Loomis
Awning... C. H. Wright

Axle and axle box... M. W. Brooks
Axle. Vehicle... W. N. Meckian
Back peddling brake... R. W. Perry
Badges, brooches, etc. Safety-catch for... A. Knaus
Bale tie machine... W. A. Laidlaw
Bales. Apparatus for covering cylindrical cotton... M. Swenson
Baling press... M. Mead
Bandage. Head... B. P. Fields
Basin. Catch... J. Banwell
Battery... P. E. Francken
Battery-diaphragm. Porous... G. T. Evanson
Bean or seed sorting machine... W. W. Balch
Bearing. Antifriction... S. S. Eveland
Bearing. Dust-proof roller... J. J. Koller
Bearing for rolls... R. W. Pain
Beer cooler and ice-water device. Combined... J. W. Harris et al
Belt... C. M. Butler
Belt attachment... W. W. Duvall
Belt clasp... F. A. Fairbrother, Jr.
Belt slide... J. D. Hetherington
Belt support... M. H. Wilson
Belt tightener and stretcher... J. S. Engle
Binder. Adjustable periodical... L. Swanson
Binder. Loose leaf... J. A. Bradford et al
Blind. Self-acting roller... F. J. Watkinson
Blind stop. Window... T. A. Upson
Boiler... J. H. Arrasmith
Book... J. H. Rand
Books, etc. Support for... C. E. Jewell
Bookcase. Folding... N. G. French
Boring machine for taper holes... G. Renton
Boring tool... J. F. Cadell
Bottle filling machine... T. L. Valerius
Bottle or jar closing apparatus... C. Carr
Bottle stopper... O. Adams
Bouquet holder... J. Luth
Box... R. M. Hartnett
Box covering machine... H. B. Blackinton
Box fastener... E. Larson
Bracket... W. D. Richter
Brake... S. L. Mitchell
Brake beam... 2 pats. F. K. Fassett
Brazing-flux... F. Pitch
Brick machine... C. Chambers Jr.
Briquets. Machine for compressing peat or other material into... A. A. Sutherland
Brooder. Chicken... H. Thiemann
Broom head... E. H. Buchanan
Buckle. Belt... W. W. Covell
Bulkhead-doors. Means for operating... C. D. Torr
Burglar alarm... W. Brown
Button. Collar... T. O. Holland
Button setting machine... C. J. Marks
Button setting machine... A. Dewes
Button setting machine... 2 pats. E. Flagg
Cabinet for stoves, dishes and kitchen utensils... J. J. Jacots
Cake-board... P. A. York et al
Camera adjusting device... K. Nelson
Camera multiplying attachment... F. H. Grover
Camera screen holder. Photographic... E. E. Flora
Can cleaner... W. E. Leighton
Can filling machine... C. S. Bucklin
Can filling machine... C. H. Ayars
Can opening device... C. E. Noore
Candelabrum... H. F. Nehr
Cane... F. Caples
Cap. Miner's... W. Israel
Car brake and speed regulator. Automatic... D. E. Brackett
Car controller. Electric... B. W. Scott
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Car door... F. C. Robison et al
Car. Dumping... J. O. Hipp
Car fender... J. Craig
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Car replacer... T. Crawford
Car roof... G. B. Maltby
Car. Street... P. M. Kling
Car wheels. Mechanism for forming... T. A. Fraser
Carbon apparatus for machinery... W. H. Marshall
Carbonating apparatus. Liquid... J. H. Chamk
Carburetor... C. M. Kemp
Carpenter's clamp... J. O. Jeffres
Carriage. Baby... E. S. Tillinghast
Cart. Elevating... W. Palen
Cash indicator... D. K. Allison
Cash register... reissue... O. W. Hunsaker
Casket handle... W. W. Kulp
Caster. Furniture... H. B. Kelper
Casting mold for journal brasses... G. H. Clamer
Cattle guard... E. L. Arnold
Cement. Manufacture of asphaltic... A. W. Dow
Centrifugal machine... J. W. Macfarlane
Chain. Wire... W. B. Lashar
Chair... H. Mayers
Chair base. Barber's... E. E. Koken
Chair bottom... C. C. Gilger et al
Cherry pitter and fork. Combined... J. A. Crandall
Chimney top... S. O. Streby
Choke piece. Detachable... R. P. Cory
Cigar case... S. P. Coe
Cigar machines. I terchangable roller for... T. E. Carpenter
Cigar wrapper cutter and rolling table. Combined... J. R. Williams
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Clamp... H. Jorgensen
Clamping dog... M. B. Hill
Clavier. Practice... A. C. Bergman
Clock. Alarm... W. E. Porter
Clock. Program... A. W. South et al
Clock crusher... T. J. Hubbell
Clothes line reel... O. N. Sanders
Clutch and brake. Free wheel... R. W. Perry
Clutch. Friction... L. W. Witry
Coal or rock drill... L. K. Koontz
Cock. Automatic cylinder... C. L. Torrey
Coin chute... K. Uchermann
Collapsible box... A. Winter
Collar banks, &c. Machine for folding... J. Maitland et al
Collar fastener. Horse... D. Radcliff
Collar iron... C. L. Cook
Combs. Manufacturing celluloid... C. Bensinger
Concentrator... 2 pats. S. W. Traylor
Concentrator, amalgamator, and separator. Combined... W. O. Journeay
Condiment holder... S. Svendsgaard
Confectionery. Apparatus for preparing syrup for... E. Shaw
Cord cutter... S. H. Wiesedeppe

Corner plaster supporting strip... J. Koch, Jr
Cot... F. G. Bullock et al
Counter... E. W. Read
Counter. Window... G. Chatterton
Crank. Variable leverage driving... W. S. Weatherwax
Crate... J. W. Sayre
Culinary utensil... L. Harding
Cultivator... R. E. Joseph
Curler. Hair... J. A. Crandall
Curler. Hair... E. Myette
Curtain pole ring... F. Perry
Cyanid vats, &c. Apparatus for charging or discharging... A. D. Jansen
Dam. Movable... J. H. Shedd et al
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Damper regulator for boiler furnaces. Automatic... W. A. Kendrick
Dental disk mandrel... C. J. Reynolds
Dental forceps... J. B. Davis
Dental or surgical chair... G. Holtz
Dental press... F. O. Jaques, Jr
Desk and seat. Adjustable school... J. M. Sauder
Desk lock... H. D. Allen
Desk. Shipping and filling... C. Lohrman
Die or tool holder... H. Wharton
Die press. Rotary... J. P. Seymour
Die press. Rotary... R. C. & J. P. Seymour
Dining room tramway... A. L. Willoughby
Dish-washing machine... T. W. Pugh
Display card... E. J. Templar
Display rack... C. F. Saylor
Doll's house... S. D. Rosa
Door-check... J. M. Geary
Draft regulator... A. L. Yates
Draft regulator... J. H. Pearson
Drawer case. Dust and mouse proof... S. J. Simmons
Drawers for desks, bureaux, etc. Device for guiding... F. F. Dumke
Drawing or spinning frames. Weighing mechanism for... C. R. McGowan
Dredger and gold saving machine. Submarine... J. A. Kirk
Drenching bit... G. W. Greenfield
Drill holder... E. P. Jones
Drying apparatus... L. Attwood
Dust pan and sprinkler. Combined... C. St. Hilaire
Dynamo frame... A. Churchward
Edgetrimming tool... C. G. Belmer
Egg beater. Ball-bearing... E. J. Scopes
Egg or fruit case. Collapsible... J. F. Parker
Electric batteries. Automatic means for conserving energy of... P. Siegal et al
Electric battery... G. d'Infeville
Electric circuits. Instrument for measuring the resistance of... E. K. Brown
Electric conduit capping... W. F. Bossert
Electric controller... C. H. Keeney
Electric furnace... J. F. Hammond
Electric machinery. Dynamo... A. Churchward
Electric motor... D. P. Burdon
Electric motor... J. Darling
Electric switch... E. S. Cook et al
Electric ground-plugs. Implements for sinking... W. E. Fisher
Electric machines. Oscillating device for brush-holders for... W. Cooper
Elevator doors. Electric latch for... N. P. Otis et al
Embroidery hoops. Adjustable holder for... G. F. Isgrig et al
Engine-indicators. Record motor for... T. A. Hill
Engine starting device. Explosive... W. E. Twichell
Engines. Fuel mixing and charge controlling apparatus for hydrocarbon explosive... A. Krastin
Engines. Sparking mechanism for internal combustion... H. M. McCall
Evaporating pan juice transfer... D. A. Williams
Explosive engine... A. Hayes
Extension table... T. J. d'Aperry
Eyelet or similar machine... H. T. Sperry
Fabrics. Apparatus for distending textile... W. Mycock
Fan motor. Spring... P. Neagle
Fan. Rotary... M. Rolle
Fats. Decomposing... G. Dangoise
Faucet for beer barrels. Inside... W. J. Kennedy
Feed water heater... T. J. Cookson
Felly planning machine... G. A. Ensign
Fence wires. Tool for attaching intermediate... J. B. Cleveland
Fifth wheel... S. N. Long
Fire alarm. Thermostatic... 2 pats. H. C. Vierkant
Firearm. Automatic revolver... 2 pats. W. J. Whiting
Fireman's hose holder... E. A. Whitaker
Fireplace... L. B. Arnold
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Flour bolt. Gyratory... S. T. Green
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Flour mills. Automatic feed regulator for... A. Dewey
Fluid compressor... F. C. Weber
Folding jack... E. S. Northrup
Foundry flask bottom board... D. B. Lincoln
Frame... A. P. Monnier
Fringe applying apparatus... A. S. Horlacher
Furnaces. Metal purifying attachment for blast... M. J. Lynn et al
Fuse plugs for cut out blocks... J. Sachs
Gage... W. L. Bird
Game... G. J. Kelly
Game table... J. P. Moyer
Garment clasp... S. Katz
Garment clasp. Detachable... A. A. Henshaw
Garment supporter adjusting clip... C. C. Lantz
Gas. Apparatus for the manufacture of... H. C. Rew
Gas engine... H. M. McCall
Gas generating apparatus... W. J. Faulkner
Gas generating apparatus. Acetylene... E. N. Dickerson
Gas. Manufacturing... H. C. Rew
Gas regulator... A. G. Bayles
Gate... W. Luckow
Girdle. Hip form... N. S. Kerr
Glass globe or shade. Prism... O. A. Mygat
Glutinous substances. Manufacturing... A. Mitscherlich
Gold saver... M. Flatland
Grading and ditching machine. Automobile... M. G. Bunnell
Grain binder folding platform... J. J. Schall et al
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Groove cutting machine..... H. P. Jones et al
Gun sight..... L. Orge
Hame..... E. B. Hagood et al
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Harness shield attachment..... T. L. Flynn
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Hat box..... H. Spengler
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Impact tool..... J. B. Rhodes
Inkstand, Pocket..... J. A. Crandall
Interrupter..... R. H. Cunninghamham
Ironing board holder..... A. J. Fredricks
Jar opener, Fruit..... H. W. Bogart
Joint fastener, Metallic..... G. H. Rhynedance
Journal and bearing therefor..... H. Thernal
Journal box dust guard..... E. B. Harrison
Kiln..... E. Lambert
Knitting machine, Rib..... L. N. D. Williams
Labelling machine..... W. E. Pettie
Ladder, Automatic locking extension..... S. T. Waggoner
Ladder, Fireman's..... J. Zajicek
Lamp, Electric..... T. A. Smith
Lamp font, Safety..... W. Notely
Lamp hanger..... H. L. White
Lamp socket, Electric..... J. T. Robb
Lamp terminal, Electric vapor or gas..... P. C. Hewitt
Lamp, Vapor..... P. C. Hewitt
Lamps, Apparatus and circuit for operating electric..... P. C. Hewitt
Lamps, Regulating-socket for multifilament incandescent..... C. A. Hussey
Lampblack, Apparatus for making..... G. Wegelin
Lantern for electric or other lights..... J. C. Fleming
Lantern, Railway..... J. F. King
Lantern slide clamp..... J. H. Smith
Latch, Sliding door..... W. K. Kaye
Lathe backing off attachment, Engine..... W. T. S. Johnson
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Leather covering machine..... R. D. Scott
Lifting jack..... R. S. Berger
Lifting jack..... S. O. Brosius
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Lino type machine..... E. J. Wich
Liquefaction of aeriform fluids, O. P. Ostergren
Liquid concentrating apparatus, 2 pts. E. Shaw
Liquid heating device..... A. Elmendorf
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Lock..... F. H. Mills
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Locks, Electrically controlled mechanism for time..... W. Rees
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Mat..... H. A. Weil
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Match igniting device..... E. W. Bovee
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Match safe..... F. Schneckenburger
Measuring roll, Cloth..... J. E. Windle
Metal wheels, Machine for making..... E. Einfeldt
Metal working machines, Magnetic holding table for..... M. Barr
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Mirrors, Insect disturbing device for..... G. Vinson
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Nut lock..... W. N. Keen
Nut lock..... G. H. Roberts, Sr
Nut lock..... J. E. Ward
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Photographic printing frame..... C. Whetham
Photographic records, Automatic developing apparatus for..... A. Pollah et al
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Pictures, &c. Holder or exhibitor for..... G. Schwab
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Punch, grip, and wrist machine, Combined..... J. Heissenberger
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Railway..... W. L. Beach
Railway draft appliance..... J. J. Hennessey
Railway joint lock..... L. E. Ayres
Railway signaling system, Electric..... A. J. Wilson
Railway tie plate and brace..... H. A. Jourdan
Railway track gage..... B. F. Lynd
Rammer, Pneumatic..... J. Keller
Reflector, Light..... J. C. Fleming
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Ruler, Parallel..... A. Brustanoby
Sack holder..... T. J. Davis
Safety hook or link for chains, etc..... S. R. Patten
Safety pin..... O. C. Graf
Safety pin..... S. G. McClain
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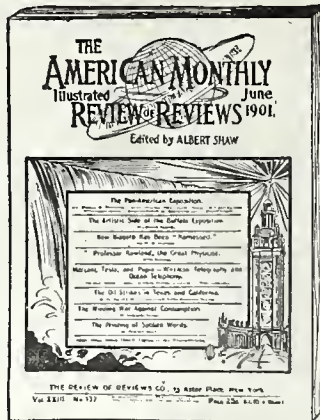


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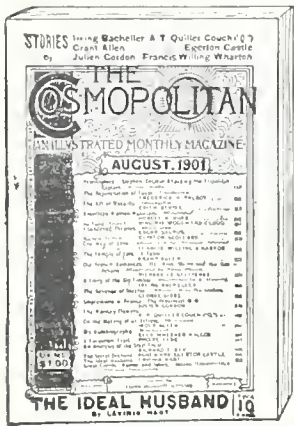
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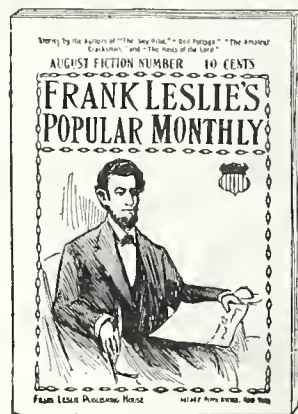
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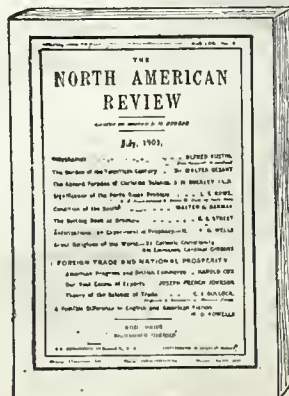
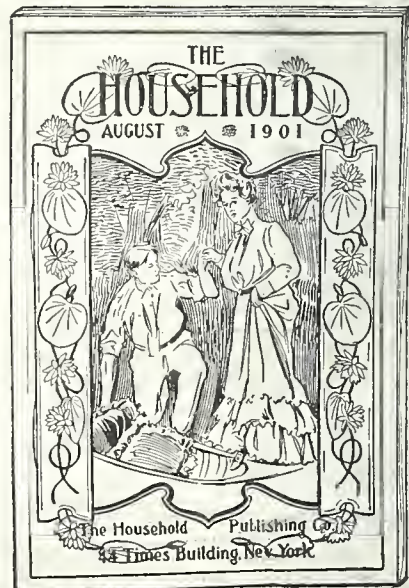
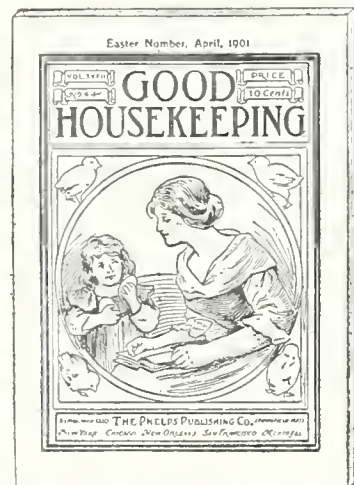
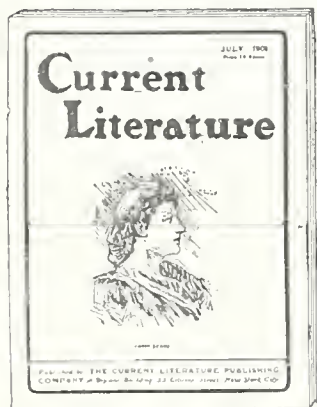
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NATIONAL IRRIGATION

BY THOMAS F. WALSH

President of the National Irrigation Association.

FARMING BY IRRIGATION is almost as old as the history of man. It has always been successful, both in ancient and modern times. Who can look upon the teeming, bounteous crops of the irrigated valleys of the West without feeling convinced of the success of irrigation, and wishing in his heart that thousands of poor unfortunates who are stranded in our crowded cities could be settled upon small farms like those of the irrigated West?

There is no question before the American people, the successful solution of which promises greater rewards and is laden with such momentous bearings upon the present and the future of our country, as the reclamation of our arid lands by irrigation. Through the building of national reservoirs and the storage of the waters in the flooded season, a large part of the now unproductive lands can be brought under the highest form of cultivation, thereby adding an immense area to the productive lands of our country, extending from the semi-tropical climate of southern Arizona to the boundary line of British Columbia, and from the Missouri River to the Pacific ocean. This area possesses every variety of climate and the richest of soils which when watered, is capable of producing every fruit, cereal and plant grown or needed by man. This vast arid territory is equal in area to one-third of that of our entire country, and if only one-half of it can be brought under irrigation, what a magnificent new country and what new markets it will open up and provide for our people.

One of the greatest advantages of the irrigation system in addition to the certainty of raising crops which it gives, is the great variety of fruits, vegetables, and other products which can be grown upon a small farm, comprising every necessary of life. The visitors to the irrigated valleys of the West during the summer months will find alfalfa growing so luxuriantly that it taxes the farmers to keep it cut and stacked. On every farm they will see fields of the finest of small grain and vegetables, fat, glossy cattle browsing in the rich pastures of clover and timothy, orchards bearing

the most luscious of peaches, pears, apples, plums, and apricots, besides the smaller fruits, well-designed modern houses, their front yards beautiful with evergreens, the air perfumed with the fragrance of roses and other flowers, and sweeter and better than all, they will hear the merry laughter and see the sunny, bright-eyed faces of the happy children reveling in the pure air and wholesome surroundings of their country home. Less than twenty years ago these valleys were a desert waste. The diversion by inexpensive ditches of the running waters has converted them into ideally perfect farm homes.

The great beneficial changes brought about by private capital can be duplicated on a proportionate scale by the construction of storage reservoirs and the storage of the flooded torrents that now not only run to waste but carry destruction to the lower countries every spring. Private effort has made homes for thousands. This new field would make homes for millions, and would cover a region vaster and larger than shelters a dozen European nations.

It is not expected that every rivulet and stream in the arid region will justify the erection of national reservoirs. On the contrary, it is only on the large river courses where all of the conditions are perfect, such as abundance of water in the season of floods, natural reservoir sites, covering large tracts of irrigable fertile government lands, that any of these storage reservoirs should be built. Officers of the United States Geological Survey have made very extensive explorations, surveys of the land, measurements of water flows, investigated the fertility of soils, and in fact secured every data including the engineering difficulties connected with the undertaking, upon which to base estimates of the probable success and expense of the work, as well as to enable them to select the most desirable places to build reservoirs, so as to insure absolute success.

Among the objections that are heard made against the government taking up this great work was one by a prominent member of Congress from one of the middle states. He said it would increase the acreage of productive land and thereby decrease the value of lands in his state. Is not this a short-sighted view to take? Where would we have been if our forefathers had adopted that view and clung to a little strip of land along the Atlantic seaboard? Has the enormous increase in agricultural products in Colorado and other Western states reduced the price of farm products in Illinois one cent?

President Roosevelt brought this matter forcibly to the attention of Congress in his message of last December. He said:



DIGGING AN IRRIGATION CANAL

Making a deep cut by using hydraulic giants. The force of the water is cutting a way through the hills by which a stream can be conducted to the land to be irrigated.

"The reclamation of the unsettled arid public lands presents a different problem. Here it is not enough to regulate the flow of streams. The object of the government is to dispose of the land to settlers who will build homes upon it. To accomplish this object, water must be brought within their reach.

The pioneer settlers on the arid public domain chose their homes along streams from which they could themselves divert the water to reclaim their holdings. Such opportunities are practically gone. There remain, however, vast areas of public land which can be made available for homestead settlement, but only by reservoirs and main-line canals impracticable for private enterprise. These irrigation works should be built by the national government. The lands reclaimed by them should be reserved by the government for actual settlers, and the cost of the construction should, so far as possible, be repaid by the land reclaimed. The distribution of the water, the division of the streams among irrigators, should be left to the settlers themselves in conformity with the state laws and without interference with those laws or with vested rights. The policy of the national government should be to aid irrigation in the several states and territories in such manner as will enable the people in the local communities to help themselves, and as will stimulate needed reforms in the state laws and regulations governing irrigation.

The reclamation and settlement of the arid lands will enrich every portion of our country, just as the settlement of the Ohio and Mississippi valleys brought prosperity to the Atlantic states. The increased demand for manufactured articles will stimulate industrial production, while wider home markets and the trade of Asia will consume the larger food supplies and effectually prevent western competition with the eastern agriculture. Indeed, the products of irrigation will be consumed chiefly in upbuilding local centers of mining and other industries, which would otherwise not come into existence at all. Our people as a whole will profit, for successful homemaking is but another name for the upbuilding of the nation.

The necessary foundation has already been laid for the inauguration of the policy just described. It would be unwise to begin by doing too much, for a great deal will doubtless be learned, both as to what can and what cannot be safely attempted, by the early efforts, which must of necessity be purely experimental in character. At the very beginning the government should make clear, beyond a shadow of doubt, its intention to pursue this policy on lines of the broadest public interest. No reservoir or canal should ever be built to satisfy selfish personal or local interests; but only in accordance with the advice of trained experts, after long investigation has shown the locality where all the conditions combine to make the work most needed, and fraught with the greatest usefulness to the community as a whole."

The Secretary of the Interior in his last report to Congress said:

"In my report for last year attention was called to the importance of providing, through wise administration, for the creation of homes for millions of people upon the arid but fertile public lands. This matter is being given increased attention by the public press and by writers upon the subject, and at the last session of Congress hearings were held by the Committees on Public Lands and on Irrigation of Arid Lands of the House of Representatives.

Briefly stated, the results of the examinations of the extent to which arid lands can be reclaimed by irrigation, made by the committees of Congress, show that while one-third of the United States is still vacant there are relatively few localities where homes can now be made. This is not because the soil is barren or infertile, but on account of the difficulty of securing an adequate water supply. There is water to be had, but this water is mainly in large rivers, from which it can be taken only by great structures, or the supply comes in sudden floods and cannot be utilized until great reservoirs have been built. It is impossible for a laboring man or an association of settlers to build these great works.

The pioneer coming to the arid region found many small streams from which water could be taken out upon agricultural land. He was able, through his own efforts, to irrigate a small farm and to make a home. These easily available waters have been taken, and a man can no longer secure a foothold, although there still remain 600,000,000 acres of vacant land. It is possible, by water storage, and by building diversion works from great rivers, to bring water to points where such men can utilize it and can enjoy opportunities similar to those had by the earlier settlers. Unless this is done much of the country must remain barren, and thousands of men and women eager to become independent citizens must remain as wanderers or tenants of others.

Enough work has been done by private capital to demonstrate the fact that water conservation and the diversion of large rivers is practicable, but, like many other works of great public importance, it cannot be made a source of profit. The works of reclamation already constructed have, as a rule, been unprofitable, and capitalists are no longer seeking opportunities for reclaiming desert land when the probabilities are against their receiving an adequate compensation for the risk and labor involved.

It has been estimated that the western half of the United States would sustain a population as great as that of the whole country at present if the waters now utilized were saved and employed in irrigating the ground."

Congress should take up the work of building these reservoirs because it is wise, sensible, and just from every standpoint. Our population is increasing by leaps and bounds; the desirable public lands are nearly all gone. See what a rush there was to secure farms at the Oklahoma reservation opening a short time ago.

If all the water in the arid region which in flooded seasons, goes to waste, can be stored and utilized, a productive territory capable of supporting 20,000,000 people will be added to the United States.

We live in a progressive age and in the most progressive country that ever existed, so far as human liberty and advancement are concerned. If we continue to be true to our destiny we must go forward in the promotion of human happiness. The fortunate and the strong must help the unfortunate and the weak. We must not only live and let live, but must live and help others live. Individual ingratitude, which is sure to be met with in life, must not prevent us from enjoying the luxury of doing good. Each one of us can add his mite to bring about such changes in our conditions and along peaceful lines as will make it easier for every human being to earn the necessities and some of the luxuries of life. Our successes in all the affairs of life will not be judged by the great fortunes individuals derive from them, but by the distributed blessings they will confer upon the masses. The discoveries of the hidden powers of nature, of new inventions and labor-saving machines, intended by the Creator to benefit humanity, must not be used as a medium to keep men from earning their bread, as is only too often the case under our present system. Conditions which will give every one enough to eat will not detract one atom of pleasure from the rich; and there is no class of people more anxious to banish poverty than the rich and well-to-do persons of our country. It is along these lines that this irrigation question appeals to us the strongest, always assuming it to be a wise business proposition, and there can be no doubt it is. The creation of millions of new homes for our citizens to live and enjoy liberty and happiness in, will be one of the grandest undertakings of this remarkable age.

New Reversing Gear.

We observe that Messrs. Galloways, Limited, of Manchester, have patented a new arrangement of reversing gear which ought to be of great value in many operations. In rolling mills, for instance, the engines require frequent reversal, and as these are usually arranged, after the steam supply is cut off from the engine, the steam already in the cylinders and in the length of the steam pipes between the shut-off valve and the cylinders continues to drive the engine until it is exhausted; and this is more especially the case when there is a condenser. Thus every time the engine has to be reversed, time is lost in stopping it. Messrs. Galloway's invention is intended to remove this difficulty. A shut-off valve is placed in the exhaust pipe, and so arranged that it is opened and closed by the same action which opens or closes the valve that admits steam to the cylinders. Thus by a single operation steam is cut off from the engine, and simultaneously the flow of the exhaust steam to the atmosphere or to a condenser is stopped. Conversely, by opening the valve to admit steam, and at the same time the valve which allows the pent-up steam to exhaust from it, starting the engine is effected.—*The Trade Journals' Review*.

The Electrical Age Prize Offer.

The Electrical Age has offered four prizes of \$100, \$75, \$50 and \$25 respectively, for the four best articles dealing with the scope of an institution suggested by a correspondent of that paper.

It appears that some one, signing himself "An Old Inventor," wrote to the editor of *The Electrical Age* stating that the great majority of inventors are men without the means to construct or work out personally the purely mechanical details of, and the securing of patent rights for their ideas, and suggesting that one of the greatest needs of the present day is the establishment of an institution, suitably governed, to which inventors could take their ideas without fear of having them pirated.

The idea is to establish a model shop and laboratory on a self-endowed basis, to which men of national reputation, for instance, professors of electrical, mechanical, hydraulic, steam and other branches of the engineering practice, in the great universities, could easily be prevailed upon to act as governors and pass upon the inventions submitted to them.

It would be possible, under such circumstances, for an inventor to bring his plans to such a board without fear of having his ideas stolen. If these plans were adjudged worthy by the board of governors, the shop would construct the model, and the legal department of the institution apply for patent rights, thus saving the inventor from that class of attorneys who would seek either to steal his invention or rob him as much as possible in securing his patent.

The Electrical Age thinks so well of the plan that they have decided to devote the next two issues of their paper for letters and contributions expounding the matter at length. The articles should treat of the scope of such an institution, going into reasonable details as to its mission, government, operation, departments, conduction and maintenance. They say that if the right plan is developed by this competition, the money needed for the plan will be forthcoming. No article should be more than 3,500 words in length, and every article submitted in this contest must be received at the office of the Electrical Age, 150 Nassau Street New York City, by March 1, 1902.

The winners will be announced in an early issue and the awards made at the same time. The judges, whose names will be announced later, will be men of national standing and reputation. Such manuscripts as are submitted should be typewritten on one side only of the paper.

Tin Poisoning.

Colored stockings have often been accused of causing poisoning. Not only does the pattern on the stockings sometimes cause eruptions on the legs, but in some cases poisonous materials have been absorbed into the system. Arsenic, which in the early days was often present, used to be the injurious metal. This, however, is a mode of arsenical poisoning of which very little has been heard for many years. Now it is tin which is arraigned.

In producing certain delicate colors in silk, chloride of tin is used as a mordant, and in some cases it is said that this salt exists in the dyed fabric in very large proportions. Hence, when the fabric takes the form of stockings and the feet perspire, the salt dissolves and is absorbed with disastrous results.

The moral seems to be that persons who perspire should not wear pretty silks next their skin unless they can be sure that they are not dyed with colors mordanted with tin.—*The Trade Journals' Review*.

THE DEAN OF THE PATENT OFFICE.

The Long and Distinguished Services of Prof. Wilkinson.

THE Dean of the examining corps of the Patent Office, by virtue of seniority of service, is Prof. A. G. Wilkinson, the Principal Examiner in charge of Division Twenty.

Professor Wilkinson was a member of the famous Yale class of 1856, which also graduated Justices Brown and Brewer of the Supreme Court, General Wager Swayne, and Senator Chauncey M. Depew. After receiving the degrees of A. B. and A. M. at Yale, he went to Europe where he continued his studies at the College de France, in Paris, and at the University of Heidelberg. In addition to the degrees received at Yale, the Columbian University has conferred upon him an A. M. and Ph. D., and an honorary degree of M. D., was received as the result of scientific medical articles which he wrote in 1862 and 1863.

necessarily been accompanied by many changes in practice and improvements in methods. Prof. Wilkinson has not only kept pace with the Office, but has always made his experience available for bettering the service, and by his ability has been instrumental in effecting many of the improvements which have been added to the proficiency of the Office. He is not one of those who delight to desecrate upon the good old days that have gone, but thoroughly believes in the progressive, active present.

During his long career in the Office, Professor Wilkinson has made many friends and few enemies, and he is nearly as proud of having made the latter as the former. On one occasion during those days when each Principal Examiner conducted the interferences arising in his division in addition to his other duties, one of the contestants became very much aggrieved over a decision. He went with influential friends to President Johnson and urged that Prof. Wilkinson should be removed. The President, however, remarked that Secretary Browning was, in his opinion, fully capable of running the Interior Department

he is blacker than you have painted him, but that does not prevent him from being a good officer, I will send for him and you can make your charges." The complainant demurred, and Secretary Browning remarked, "You can make no charges behind the backs of my officers that you are unwilling to face them with."

In 1878, and again in 1889, and also in 1900 Prof. Wilkinson served as a member of the International Jury of Awards at the Paris Exposition of those dates. He also presided over the Fourth section of the Paris International Patent Congress of 1889. He is an accomplished linguist, having occupied the chair of modern languages at the University of Missouri, prior to his connection with the Office. His title of "Professor," by which he is commonly addressed, is therefore deserved and not one of the Kentucky Colonel type.

Although Prof. Wilkinson is the senior in point of service, several of the Principal Examiners are his seniors in age, and one expecting to find in him an example of the last generation with which to compare the younger Examiners of the present.

Cylindrical Printing Press" in 1837. Hoe, however succeeded in getting the patent, and Jephtha returned to his native England, where in London he and his descendants have continuously manufactured and sold the presses up to the present date. Israel Wilkinson invented and used the first machine for making screws in this



PROF. A. G. WILKINSON,

country about 1730, and he also, in company with his cousin, Stephen Hopkins, signer of the Declaration of Independence, erected and operated the first iron furnace in this country. Another direct ancestor, Oziel Wilkinson, in company with his son-in-law, Samuel Slater, built and operated the first machinery in this country for manufacturing cotton cloth in 1793. He also made nail machines and made with them the first cut nails in this country, selling them at 18 cents a pound and often receiving for them in change, flour at \$16 a barrel. He made, so far as can be ascertained, the first solid cannon ever made in the world. Among his papers is a letter, in which he remarked that he considered he was doing a brisk business, if within one year from his purchase of the raw cotton, he marketed the cloth and received his pay for the same. David Wilkinson invented in 1783 the sliding lathe for turning iron and brass, and the United States Congress voted him \$10,000 for its use in all government shops. He also built and ran a small and rude steamboat in the same year.

Division Twenty treats of builders hardware, safes and dentistry. At one time the class of surgery was examinable in this division but it was transferred to another division of the Patent Office. Professor Wilkinson has an able corps of assistants.

Nickel Steel.

From many sources we learn that nickel steel is now largely used in the railway and locomotive works of the United States for the purpose of making crank pins. Nickel steel has a high elastic limit and is therefore peculiarly fitted for use where alternating stresses of tension and compression are severe. Nickel in the steel increases the elastic limit, which property makes it very satisfactory for all sorts of severe service. Nickel is allied to iron in physical properties. It is found in nature along with iron and alloys well with it. For crank pin service it is a most highly satisfactory material.



He entered upon his duties in the Patent Office on July 1, 1864, and after serving as a First Assistant Examiner less than four years, he was on May 15, 1868, appointed Principal Examiner. During the thirty-seven years he has served in the office, he has seen it grow up around him from its comparative infancy to its present magnitude. The number of patents granted has increased from about 43,000 (in 1864) to nearly 700,000. The examining corps has grown from less than 50 to about 320, and the number of Divisions has been added to from time to time until they now number 35 instead of only 12, as in 1864.

The marvelous progress which the Office has made during this period has

without his assistance. The Secretary was then strongly importuned to remove the alleged unfair Examiner. Secretary Browning reminded the angry attorney and his friends that their proper remedy was an appeal from the Examiner's decision, and that the courts were open to them to have the decision reversed if it was unfair. The Secretary was then asked if the Examiner's decision should be reversed would he then dismiss him. Mr. Browning replied, "Oh, no, I will merely think the Court and the Patent Office expert differ in their opinions." Said the complainant, "He is, Secretary Browning, the blackest sort of a Republican." "Yes", said Mr. Browning, "I know Mr. Wilkinson myself,

would be greatly mistaken, as none of the young Examiners is more energetic and active in the performance of his duties.

In Prof. Wilkinson the Patent Office has an able and efficient officer who has been an ornament to it for many years, and his present vigorous health gives promise that for many years to come his valuable services will be given to the work with which he has been connected so long and so honorably, and which he has always performed with credit and distinction.

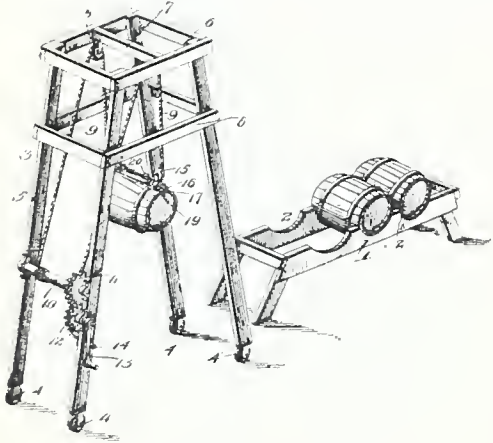
Prof. Wilkinson comes from a family of inventors. Jephtha one of his ancestors, Jephtha A. Wilkinson, was the inventor of a machine for making weaver's reeds and of the "Rotary

CLEVER NEW PATENTS.

Hoisting Apparatus.—Rail Joint.
Cultivator.—Steam Engine.—
Excavating Machine.

Hoisting Apparatus.

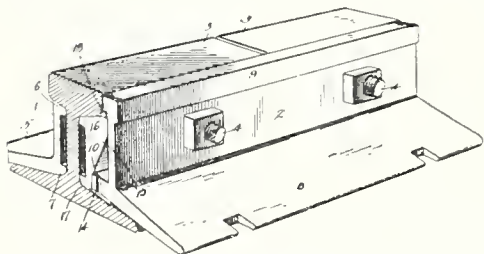
Mr. Hiram O. Hood, of Carthage, Mo., has invented a labor-saving device in the form of a portable hoist for barrels, and the like, that will appeal to a great many people who have heretofore had to stack or pile barrels by hand or means of skids and similar antiquated devices. He employs a



frame comprising four standards connected at their upper ends by cross beams and supported upon wheels, whereby the frame can be transported from place to place. The standards are separated sufficiently to pass on either side of a rack upon which the barrels are to be supported. Upon the frame is journaled a windlass from which extend ropes that pass over pulleys in the upper part, the free ends of these ropes being attached to an appropriate barrel-engaging device having prongs which fasten over the edge of the barrel. The operation will be readily understood, by referring to the accompanying cut. The barrel is first hoisted by means of a windlass to a suitable height, after which the frame is moved so that the barrel will be located directly over the rack, said barrel is then lowered into place, and the machine is removed.

Rail Joint.

The constant bumping of car wheels over the meeting ends of rails, besides being an annoyance to passengers, soon breaks down the ends of the rails, thereby ruining the same, and furthermore, is a constant wear upon the wheels. While several expedients have been effective, William J. Devers of Scranton, Pa., hit upon a simple structure which forms practically a continuous rail that relieves the train of the jars, shocks, and vibrations incident to passing over the ends of the ordinary rails.

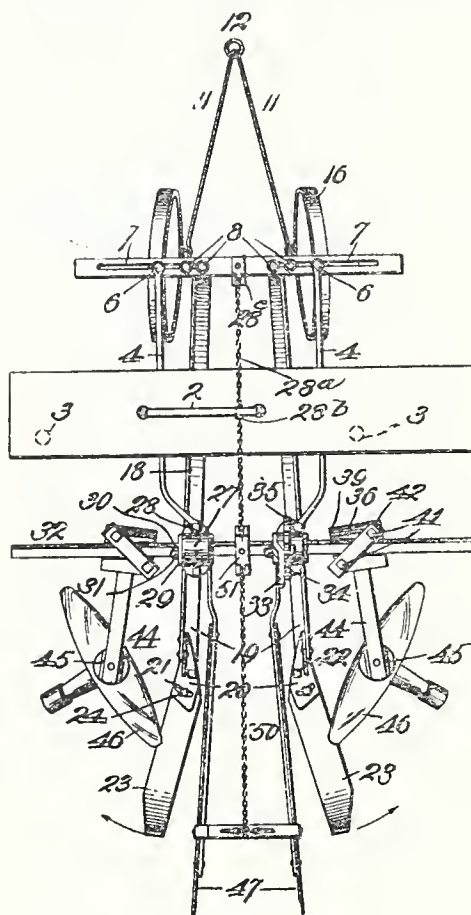


He provides an inner and an outer fish plate which bridge the joints and are secured by the usual bolts. The inner fish plate has an outwardly extending bottom flange that fits against the bottom flange of the rail, and an

inner projecting top flange that bears beneath the upper flange of the rail. The outer fish plate also has a bottom flange, and it is furthermore provided with a top or head that extends above the tread of the rail and is adapted to carry the wheels of the train over the joint, without permitting them to contact with the same. Between this outer fish plate and the web of the rail is interposed a supporting or brace plate that is secured by the bolts which fasten the fish plates in place. The ends of the head of the outer fish plate are rounded so that the wheels will readily ride up the same without any jar or shock. As a result, the meeting ends of the rails are relieved of the wear and tear, while the discomfort to the passengers is entirely eliminated.

Cultivator.

We present herewith a top plan view of a cultivator that has just been patented by William J. Wiswall, a well-known inventor residing in Kansas City, Mo., which patent has been purchased by the Ohio Cultivator Company, of Bellevue, Ohio. The invention relates to that type of two-row cultivators which are adjustable to accommodate the distance between

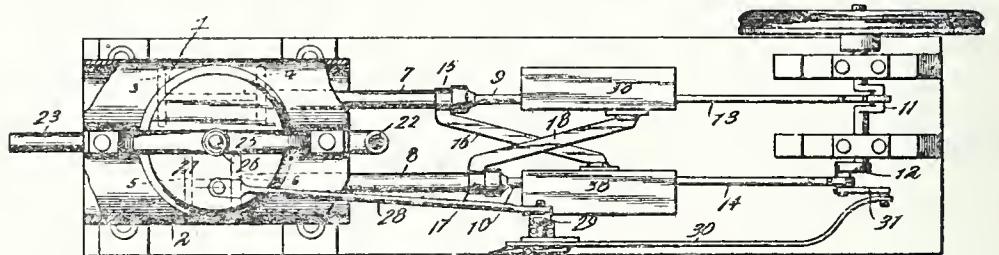


the rows, and embracing cutting disks, weed cutting knives, and a central shield to protect the plants from the earth turned by the disks. The object of the inventor is to generally improve this type of machines, and he does it substantially as follows: A suitable metallic frame is constructed which can be adjusted to the various widths of rows to be cultivated, this frame being supported at the front by runner wheels 16. Journaled upon the rear portion of the frame is a rectangular bar to which is secured arms that carry the cultivator disks. These arms are adjustably secured by novel means to the bar so that their relation may be changed, as desired. Rearwardly diverging weed cutting knives are also secured to the frame, and these

knives are likewise made adjustable. The machine operates in precisely the same manner as others of this type, but the construction is a structural improvement which facilitates and renders the work less laborious on both the driver and the draft animal. The illustration shows but one of these machines, and a portion of the transverse plank or platform. To the opposite end of this plank or platform is secured another machine, similar in all respects to the one herewith presented. A seat is attached between the two.

Steam Engine.

In 1877, Mr. Daniel H. Iseminger, a resident of Bloomington, Illinois, invented a steam engine which was a distinct departure from the ordinary engine, and had decided advantages thereover. He provided a pair of cylinders arranged side by side, and



in each cylinder was located a pair of piston heads movable in opposite directions, or in other words, toward and away from each other. Piston rods connected these several heads with a single shaft that was rotated thereby, and a valve was disposed between the cylinders to alternately introduce steam between the piston heads in each when said heads were close together, thereby driving them apart, consequently rotating the shaft and moving the heads in the other

cylinder towards each other. The important advantage derived from this arrangement resided in the employment of the expansive force of the steam against two movable piston heads instead of one, as in the ordinary engine, wherein fully half of the pressure is expended against the end of the cylinder.

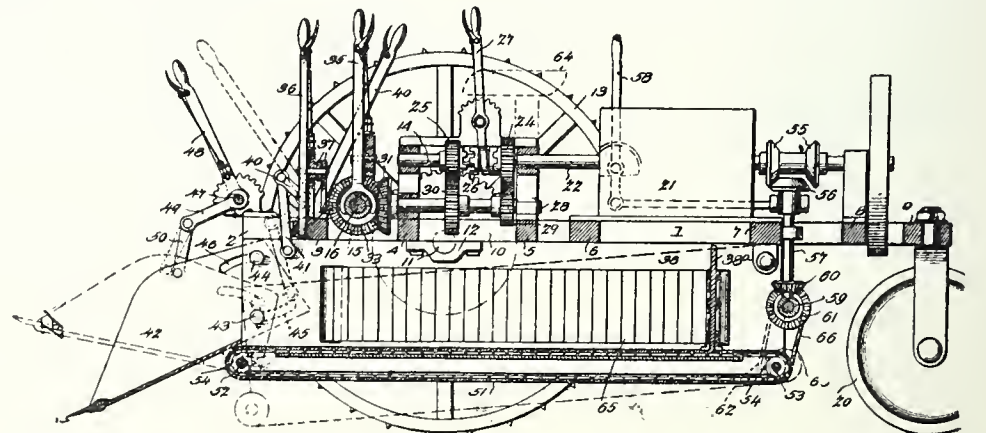
The same inventor has just completed important improvements on his engine. These improvements relate to the construction of the cut-off valve, so that the same may be kept lubricated, and is dust proof, thereby producing an easy operation of the same and reducing the wear on the valve and seat. He furthermore dispenses entirely with the use of cylinder heads, and leaves the ends of the cylinders open. To this end he locates a valve chest between the cylinders, and provides steam communication between these chests and both of said

cylinders. The upper end of this chest has an outwardly flaring flange and a seat upon which latter rests the valve, that consists of a cap having a depending rim and a flange that covers the flange of the chest. An oil groove is thereby formed, and an opening is made through the valve flange for the purpose of supplying lubricant thereto. A link connection is made between the valve and the shaft to operate the former in the proper manner.

Excavating Machine.

A very good idea can be obtained by referring to the accompanying illustration of a new device in excavating machines, conceived by an inventive genius, living in Luxora, Va., Herbert A. Wise, by name. This gentleman has hit upon a novel scheme for excavating earth and loading it, so that it can be transported away and dumped. To this end he constructs a

which are formed of endless belts 51 and 65, the back of the box or carrier being in the form of a partition 38a that is movable with said bottom and sides. The manner of operating the machine is as follows: The partition 38a is first placed at the front end of the machine, and the scoop lowered so as to come into contact with the earth to be removed. The machine is then driven forward, whereupon the soil will be forced by the scoop into the



suitably wheeled frame upon which is located a motor shown at 21, which motor operates the various mechanisms for driving the machine and scoop, and loading and unloading the material. The scoop is shown at 42, being hinged to the front end of the frame and raised and lowered by a lever 48, connected to the scoop through several arms and links 48 and 50. Directly behind this scoop is a carrier box, the bottom and sides of

carrier, and as the machine moves forward, this carrier or box will be enlarged by a backward movement of the partition 38a. When a load has been obtained, the scoop is raised and the machine moved to the place where the material is to be dumped, whereupon the side and bottom walls of the carrier or box are moved in an opposite direction, thereby carrying the partition 38a forward and expelling the material.

A SUCCESSFUL INVENTOR.

His Latest Invention
A Winner.

Thomas P. Owen was born in Adams County, Illinois, near the little village of Golden in 1865. He resided there on a farm with his parents until 1877, when they removed to Hancock County near Bowen. He received his education in the county schools, and in 1882 removed with his parents to York County, Nebraska, where he engaged in the milling business. While operating a mill at Thayer, Nebraska, he made several valuable improvements in the mill machinery, developing a mechanical ingenuity rarely seen in one so young. After disposing of the milling business, he engaged in the jewelry business, making only a secondary matter of inventions.

A measuring instrument for tinner's use, on which letters-patent were secured, was quickly followed by a tool holder for jeweler's lathes which is now on the market.

In April 1900, Mr. Owen was granted a patent on an improved combination padlock which can be opened in the dark, provided one knows the com-

This patent, which was taken out through the patent soliciting office of E. G. Siggers, Washington, D. C., April 16, 1901, bears No. 672,422, and was particularly described in the July, 1901 issue of the Age, and therefore need not be again explained. Suffice it to say, that the invention is fully protected by 37 claims, and the patent is so well thought of by manufacturers, that the inventor has been offered a very large sum for the exclusive right. Mr. Owen, being a born inventor, naturally is always developing some new idea and we shall hear of him again, but if his life work in this line should end with the straw twine mechanism for self binders, he may safely rest on his laurels as an inventor, for there is no doubt that this patent alone will suffice to make him comfortable for the remainder of his life, and bring fame as well.

Mr. Owen was married to Miss Florence Denny of Unionville, Iowa, in February 1889. Two children brighten their home, Bernice and Ethel.

Distribution of the Nobel Prizes

In our issue of March last we took occasion to refer to the prizes offered by Alfred Bernhard Nobel, the Swedish engineer and inventor, to those persons who contribute most materially to benefit mankind in the domains of physics, chemistry, medicine, literature, and in the works of peace. They were awarded this year as follows:

In physics, to Wilhelm Conrad Rontgen, professor at the University at Munich, the discoverer of the Rontgen rays.

In chemistry, to Jacobus Henricus Van Hoff, professor at the University of Berlin.

In medicine, to Emil von Behring, professor at Halle, the discoverer of the diphtheria serum.

In literature, to Sully-Prudhomme, member of the French Academy.

In works of peace, the prize was divided in two and awarded in equal parts to Henri Dunant, of Switzerland, the leading spirit in bringing about the Geneva Convention and in instituting the societies of the Red Cross, and to Frederic Passy, national economist, of France. Each of the five prizes is for the sum of 150,782.23 crowns, or more than \$40,000. Five prizes of like, or perhaps greater, amount will be awarded every year on December 10.

Alfred Nobel left substantially the whole of his vast fortune to be used for the benefit of mankind. In his last will, he directed that no consideration whatever be paid to nationality, but that the worthiest be awarded the prize, whether he were Scandinavian or not.

Acetylene Black.

The product known as "Acetylene Black," is simply a pigment black obtained by exploding acetylene at a pressure of more than two atmospheres by means of an induction spark. This black, which contains 99.8 per cent. of carbon, may be said to be practically pure. It has a constant composition, mixes well with water, and in all proportions with oils, gums, glue, and other vehicles. A writer recommends the black as being exceedingly well suited for calico printing. A color containing 50grms of the new black per litre of albumen thickening yields a good black print.

IMPORTANT COURT DECISIONS IN
PATENT & TRADE MARK CAUSES.

DECISIONS OF THE U. S. COURTS.

U. S. Circuit Court—District of New Jersey.

THE R. THOMAS & SONS COMPANY v.
THE ELECTRIC PORCELAIN AND
MANUFACTURING COMPANY *et al.*

Decided November 20, 1901.

1. PATENTS VALIDITY—ELECTRIC INSULATOR.

Letters Patent issued to John W. Boch March, 1898, for a high-tension porcelain electric insulator and the process of making it *Held* to cover a patentably novel invention.

2. PROCESS—MAKING ELECTRIC INSULATORS—PATENTABILITY—ANTICIPATION.

A process of making an insulator which consists in making two or more bowls or shells molded so as to nest or fit each other, pouring liquid glaze into the cup-like spaces between them when in an inverted position, so that it will flow down and not only fill up the joints between them, but also penetrate into whatever cracks or crevices are formed and cement and solidify the parts into a single mass, *Held* not anticipated by insulators made up of separate parts fitted to each other or by the old process of fusing parts of pottery.

3. SAME—SAME—SAME.

Held that it is not so much the fusing but the manner of doing so by which all the cracks and crevices which exist or may arise in the process of firing shall be completely closed and filled which constitutes the invention.

4. ANTICIPATION—ABANDONED EXPERIMENTS.

Where the proof shows that prior to Boch's invention a party made two-part insulators and attached them by glazing and in some instances used an extra amount of glazing material, but the results were not satisfactory and the spaces and cracks were not completely filled, *Held* not an anticipation of this invention, but an abandoned experiment.

5. SAME—APPLICATION FOR PATENT AS PROOF OF ANTICIPATION

Where it is claimed that an application filed by one Locke, to which Boch had access in the Patent Office, constitutes an anticipation of the invention, and it appears that such application said nothing of the use of an extra amount of glaze or the results now contemplated, but merely showed the glaze by a heavy black line between the parts, *Held* not a disclosure of this invention.

6. DECISION BY PATENT OFFICE ON PRIORITY—EFFECT OF.

Where the question of priority of invention was decided in favor of Boch by the Patent Office and the court of appeals, *Held* that such decisions must be accepted as controlling in the absence of evidence carrying thorough conviction to the contrary.

7. PATENTABILITY—ESTOPPEL.

Where a party has made application for a patent on the invention and contested an interference in regard to it, the contention against his successful rival that the invention is not patentable does not come with good grace.

8. PROCESS—PATENTABILITY—NEW USE.

Where a process is used under new conditions and produces new and extraordinary as well as highly satisfactory results, *Held* that it must be regarded as patentable.

Commissioners Decisions.

CAREY v. THE NEW SEWING MACHINE
COMPANY.

Decided October 16, 1901.

1. PROTEST AGAINST ISSUE OF PATENT—PROTESTANT NOT ENTITLED TO A HEARING.

A party properly obtaining a knowledge of an application pending in this Office may file a protest against the issue of a patent upon it, and may therein call attention to any facts within his knowledge which, in his opinion, would make the grant of a patent improper; but he does not thereby obtain the right to argue before the tribunals of this Office. (*Fowler v. Benton*, 17 O. G., 266, modified)

2. SAME—SAME—QUESTION IS EX PARTE IN CHARACTER.

The question of patentability is *ex parte* in character and is one between the applicant and the Office on behalf of the public, and no one member of the public can be recognized as having such an interest in the grant of a patent as to entitle him to contest the matter any further than to call attention to matters which he considers bars.

EX PARTE TREVETTE.

Decided July 22, 1901.

1. PROCESS AND MACHINE—PROCESS AND PRODUCT—PATENTABLE SUBJECT MATTER.

The law being well settled that "a process which amounts to no more than the mere function of a machine is not patentable," (*in re Weston*, 94 O. G., 1786,) it follows that as a corollary to this proposition it is equally true that a process which amounts to nothing more than the necessary or obvious manner of effecting the production of the article is not patentable.

2. PROCESS AND PRODUCT—SUBJECT MATTER.

In the case of process and product the product is the only patentable subject matter where the process is no more than the necessary or obvious manner of effecting the product. (*Ex parte Simonds*, 44 O. A., 445)

3. SAME—SAME—FORM OF CLAIM.

In the case of two claims, one being for the product and the other for the method of making that product, which method is merely a recitation of the necessary and obvious steps employed in producing the article desired, these claims though differing in form are, in effect, for the same thing—they cover the same invention; but the invention is a product, and therefore is covered by a claim which purports to be for a product. (*Citing Mosler Safe and Lock Co. v. Mosler Bahmann and Co.*, 43 O. G., 115)

4. SAME—SAME—SAME.

Where claims are presented which state nothing "more than the necessary or obvious manner of effecting the product," said claims are not patentable as processes, as they do not state the invention. It is for the invention that the patent is granted.

5. SAME—SAME—SAME.

If an alleged method claim is not patentable as such for the reason that it sets forth nothing more than the necessary or obvious manner of effecting the article or product, the claim is in fact a claim for the article or product. The claim being in fact a claim for the article, it should be so expressed.

6. SAME—SAME—SAME—PRACTICE.

When the invention is not properly claimable as a process, it is the duty of the Office tribunals to so hold, if they be of that opinion. The Patent Office should not issue a patent containing claims which on their face purport to cover one statutory class of inventions, when the invention which they do cover in fact belongs to another statutory class.



THOMAS P. OWEN

bination. It is operated by feeling and sells readily. The combination can be changed without dismembering the lock. Thousands have been sold.

For over 10 years he studied on a binder which would bind with straw, and dispense with twine, and last summer he completed an attachment which successfully binds the grain with straw taken direct from the binder. It can be applied to any of the ordinary types of self binding harvesters, providing simple and reliable means for making the binding twine out of straw during the operation of the machine. The straw twine making mechanism is geared directly to the binding mechanism so as to operate synchronously therewith—that is to say, it is in operation when the binding mechanism is operated and remains inactive or at rest therewith.

MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. SIGGERS, Washington, D. C.

John B. Hostetler, Davenport, Iowa. Cutting and Embossing Machine.—This machine is designed particularly for the use of photographers desiring to cut out oval or other forms of photographic paper, and to emboss card mounts or the like. It is a simple and inexpensive machine, and comprehends a plunger and powerful operating mechanism, actuated by hand to reciprocate cutter or embossing dies, either of which may be quickly attached to, or detached from, the plunger. Embossing in color is made possible by an inking device automatically moved forward to ink the die after each movement thereof, and capable of being held out of its operative position when the device is being used as a cutter for mounts.

* * *

John E. Jaco, Rowland, Tennessee. Air Brake Coupling.—This coupling is designed particularly for railroad air brake systems, and the coupling members or heads are automatically coupled by impact when two cars are brought together. Each head is provided with peculiarly shaped fingers, which interfit with fingers projecting from the other head and insure the proper coupling of the air conduits under all conditions. The valves which control the passage of air through the coupling are automatically opened as soon as the heads are coupled, and are similarly closed by the separation of the vehicles. Another important feature of this invention is the provision of automatic means for causing the coupling members to remain in standard positions, no matter whether the car is loaded or light. This is accomplished by an ingenious device for elevating or depressing the coupling heads to compensate for the elevation or depression of the car structure upon its supporting springs.

* * *

Dr. Henry W. Howe, City of Mexico, Mexico. Fishing Reel and Bag Fasteners.—Although he has been located in the city of Mexico for a number of years, Dr. Howe is a good American. A dentist by profession, he finds it more profitable to practice his calling in the capital city of Mexico than in his own country. He has attained prominence as a dentist, and is rapidly achieving success as an inventor. He has taken out quite a number of patents, some of which have been previously written up in the A.C.E. The three latest patents are an improvement in fishing reels and two patents on bag fasteners. The Doctor has a partner in Mr. Burke Freisleben, of Cincinnati, Ohio, who is connected with the Seinsheimer Bag Company of that city.

The fishing reel patent covers a reel remarkable for its simplicity and the ease with which it may be attached to the rod. A drag brake is provided to prevent overrunning of the line, and the handle of a hand-brake extends along the grip of the rod to facilitate the perfect control of the line while playing and landing the fish. The brake lever has a direct connection with a brake frame mounted upon the outside of the reel heads, and the frame is in turn connected with a pair of internal brake shoes, which bear against the opposite ends of the reel, and enable the angler to maintain just the desired tension upon the line at all times.

In both forms of the bag fastener, the fastener is secured to the bottom of the bag, being held in place by the bottom flaps of the ordinary paper bag, whereby it is permanently as-

sociated with the latter so as to be manufactured and sold as part of the bag. In one form the attachment consists of a piece of flat cardboard, provided at its opposite edges with reversely extending cord-engaging slits. One end of the cord is permanently fastened by the flaps of the bag. When sold to the dealer, the remaining portion of the cord is found wrapped around a detachable part of the cardboard. When it is desired to use the bag, the detachable portion is severed from the body, the cord is unwrapped therefrom, the bag filled, and the free end of the cord brought down and engaged with the cord-engaging slits. By this arrangement the cord for fastening the bag is always ready for use.

In the other invention, the fastener as well as the cord are secured in place by the bottom flaps of the bag, and thus constitute a permanent part thereof. After the bag is filled, the free end of the cord is brought down and engaged with the attachment whereby it is held in place. Both inventions embody the novel thought of holding one end of the cord, and the fastening attachment for the cord, to the bag by pasting the bottom flaps over the same, the second form having the fastener made of metal.

* * *

Frank B. Townsend, Penn Yan, N. Y. Rochester Sash Lock Company, Rochester, N. Y. assignee. Sash Lock.—This invention is an improvement on a previous patent, but it is so radical an improvement as to make a new and independent invention. It pertains to that class of locks associated with a sliding sash, and co-operating with a slide rod to lock the sash against movement in either direction, and yet permit the sash to be raised to any point when desired. The aim of the inventor, in making his last invention, was to arrange the finger controlled clutch levers, which engage the slide rod, so that they may be housed throughout their entire lengths, and will have no projection beyond the casing with which they are associated, and this is done by seating the lock flush within a stile or other part of the sash. Aside from this, the invention also comprehends a specific holding catch co-operating with the clutch levers to hold them in their inoperative positions, when it is desired to permit a free up-and-down movement of the sash without hindrance from the lock. The invention is being manufactured and sold in Rochester, N. Y., and has met with considerable success.

* * *

Nicklas H. Bloom, Nashua, Iowa. Riding Attachment for Harrows.—The invention consists in providing an attachment for harrows, whereby the rider, seated in the rear of the harrow, may observe the operation of the same. It comprises a pair of reach bars connected at their front ends to the equalizer of the harrow, and at their rear ends to the attachment proper, which consists of a frame carrying a seat and a pair of swivelled forks for the supporting wheels. The parts are effectively braced, and are constructed so that there will be no tendency to tilt or overturn. It is a very simple attachment, and could be constructed by the ordinary workman.

* * *

Charles A. Benkert, Davenport, Iowa; Edward J. Spink, same place, assignee. Thill or Tongue Support.—The invention is extremely simple, consisting of a bar or slat having comparatively narrow edges and provided with an opening through which is passed the threaded shank of a hook. The hook is L-shaped and its shank is secured in the bar by means of two nuts. The extended arm of the hook is fitted with leather or other soft material, so that it will not mar the carriage. The device is applied by engaging the hook over the base

portion of the elliptical spring, one end of the slat bearing against the cross bar of the shaft, while the other end rests against the axle. In this way, the device serves to hold the shafts up when in the stable. As the invention can be made for less than twenty-five cents, and is worth considerable more to any one who may have use for the same, the invention will undoubtedly meet with the success it deserves.

* * *

George H. Schamp, Ridgeville, Indiana; Assignor one-half interest to Enoch W. Buck, Portland, Indiana. Pipe Union.—For the purpose of securing a coupling for hose to the wall or floor of a building, this inventor provides a simple device consisting of a body portion having an interior bore that is provided with an annular shoulder, said body also having an exteriorly arranged flange, which is arranged to be fastened to the wall or floor. A tube extends into the bore of the body and has an annular collar that bears against the shoulder thereof, this tube being furthermore provided with a shank that projects beyond the collar. Packing rings are placed upon the shank to prevent leakage, and a plug is fitted into the body between the shank and the wall and bears against this packing to compress it. The supply pipe is attached to the tube section, and the ordinary flexible hose can be fastened to the exposed end of the plug. As a result, an attaching device is provided which will not leak, and may be readily taken apart if necessary.

* * *

Alvin Collins, Fond du Lac, Wis. Combined Envelope and Letter Sheet.—This is a decided novelty, for the arrangement is such that when the receiver opens the envelope, the letter is in the form of a booklet, which is of ornamental shape, and therefore can be filed away in most convenient form. The inventor has obtained two patents on his ideas, both of which are along the same line. The paper upon which the letter is written is in the form of rectangular sheets, which are fastened in a peculiarly constructed envelope. When this envelope is sealed for transmission through the mails, it is substantially similar to the ordinary envelope, and cannot be opened without detection. The receiver, to open the same, removes certain portions of said envelope, thus exposing the letter in the shape above described.

* * *

Professor Michael M. Lipps, Bluff, City, Tenn. Process for Manufacturing Compost Fertilizers.—This inventor, who is a well-known chemist, has been studying for several years on this process, which is designed to quickly and cheaply turn ordinary manure into a high class fertilizer. Briefly described, he places a quantity of well chopped manure in a box or vat, and sprinkles thereon, a small quantity of sulphate of ammonia. On top of this layer is sifted about 2½ pounds of salt, upon which is spread acid phosphate. Five pounds of lime is then sprinkled on top of the acid phosphate, after which another layer of manure is placed in the box and treated in a similar manner. This operation is repeated until the box is partially filled, and then over the whole is spread a combination of loam, soda, potash, and lime. This is allowed to stand for period of from sixty to ninety days, after which the compost may be broken into and either used immediately or stored for future use. The patent covers this process both broadly and specifically.

* * *

William A. Palmer, Ensley, Ala. Car Coupling.—This is an exceedingly important improvement in Janney type couplers, and it is finding great favor among the railroads throughout the country, having been first introduced in the South. The inventor

provides a pivoted dog that drops beneath the vertically movable locking pin of the knuckle when said pin is raised, to hold it in inoperative position, this dog being moved from beneath the pin upon the movement of the coupler. The improvement resides in the particular arrangement of the dog, and its relation to the head, said dog being provided with a pair of opposing shoulders, that engage a partition in the head to limit its movement in either direction, so that it will always operate. Further than this, the dog is provided with an exterior handle so that it can be moved by hand when necessary. The Tennessee Coal, Iron and Railroad Company of Ensley, Alabama, is manufacturing the coupler.

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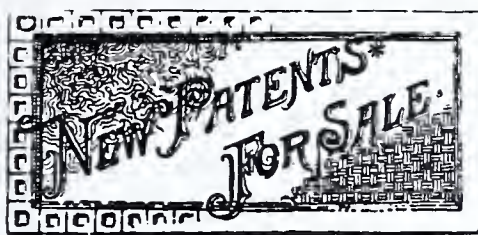
Roberts E. Bertels, Wilkesbarre, Pa. Lunch Pail or Bucket.—The novelty of this invention resides in the construction of the handle or bail, which is so made that it can be fastened against swinging upon the body, and furthermore, locks the cover in place. The means by which this is accomplished is very simple. The ears in which the bail is pivoted are provided at their lower ends with outstanding shoulders, and the ends of the bail project downwardly and detachably engage between these shoulders, thereby holding the pail or bucket against swinging. The portion of the bail that passes through the ear, is slidable therein, and the inner ends normally engage over the rim of the top, thereby holding it in place. This bucket is now being manufactured and sold in large quantities by W. B. Bertels, Son & Company, of Wilkesbarre, Pa.

* * *

Charley L. Ferriott, Bartlett, Texas. Planter.—This planter embodies a main yoke-shaped wheel-supported frame, and a plow-carrying frame located below the main frame and provided with a swiveled and hinged connection with the main frame. Plows are carried by the lower vertically-adjustable frame, and a seed box is also mounted thereon and alined between the fork members of the main frame so that it may rise between the same under the action of frame-elevating means which is mounted upon the forked portion of the main frame and in convenient reach from the driver's seat supported upon said forked portion.

* * *

John L. Ritter, Shenandoah, Virginia. Stove.—The latest patent issued to Mr. Ritter, who is an inventor of much promise, supplies a well defined demand for a stove equally well adapted for use in all climates and capable of burning fuel of any available character. The patent discloses what may be termed a combination heating stove, equipped with a removable fire pot and with provision for inserting and supporting sticks of wood, so that either wood or coal may be burned with equal facility. The combustion chamber is surrounded in part by a heating drum, and dampers are arranged in a manner to provide either a direct circulation from the combustion chamber to the stove pipe, or an indirect circulation through the heating drum. Above the top of the stove extends a smoke dome located in the lower end of a flue which may lead to another compartment. The passage of heat to the remote compartment from the flue is controlled by a register. By the manipulation of dampers a direct circulation may be secured for the purpose of supplying the maximum of heat to the upper room, or the products of combustion may be compelled to pass through the heating drum, when it is particularly desired to heat the room in which the stove is located. The various parts of the stove are so related that it may be quickly assembled by an inexperienced person, and the cost of manufacture is for this reason reduced to a maximum.



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FOR SALE—Patent No. 691,134, dated January 14, 1902. Sham Bolster Form. Made of metal. Adjustable in length. Something entirely new. Address Miss Leontina Gully, Care Mrs. M. B. Pulliam, Uvalde, Texas. (ap)

FOR SALE—Patent No. 689,296, dated December 24, 1901. Improved Stone Cutter's Tool. Has provision for making several different kinds of tools out of single structure. Is the invention of a practical stone cutter. Address Heber K. Hansen, Logan, Utah. (ap)

FOR SALE—Patent 677,843, dated July 2, 1901. Automatic Electric Cut-out. Prevents waste in house lighting. Safeguard in pumping plants, etc. Address Frederick H. Rogers, San Jacinto, Cal. (ap)

FOR SALE—Patent No. 684,064. Wagon Dump. A machine for unloading grain from a wagon into an elevator. For full particulars address Newton Inks, Ransom, Illinois. (ap)

FOR SALE or lease on royalty.—Patent No. 683,923, dated October 8, 1901. Plow Share Clamp for holding plow shares while being hardened. Address Burton E. Foster, Rushmore, Minnesota. (ap)

FOR SALE—Patent No. 687,175, dated November 19, 1901. Anti skeleton Key Lock and Attachment. Construction very simple. May be carried in the pocket and applied for a single night if desired. Address Barry & Eberhard, 547 Howard Street, San Francisco, Cal. (ap)

FOR SALE—Patent No. 688,333, dated December 17, 1901. Music chart to be used on either pianos or organs. Of great assistance to teachers. So simple that a child can understand it. Price of chart, with instructions, \$1. Address Floyd F. Dawson, Wilson, N. C. (ap)

FOR SALE—Patent No. 688,849, dated December 17, 1901. Conveyor for sweep mills. Operated by connection with the sweep. Just what the farmer has been looking for. Will sell state rights or lease on royalty. Opportunity for the manufacturer of sweep mills. Address Richard Griffiths, Barclay, Kansas. Rural Free Delivery No. 1 (ap)

FOR SALE—Patent No. 689,107, dated August 6, 1901. A Smoke Consumer. Designed to consume the smoke and economize fuel by burning the gases contained therein. Address George Allen, Franklin, Pa. (ap)

FOR SALE—Patent No. 686,115, Hydraulic Air Compressor. Can be installed cheap from any elevated water supply. Tested 90 per cent. Also patented in Canada, England, Germany and Denmark. For full particulars address F. A. McRae, 563 St. Urbain Street, Montreal, Quebec, Canada. (ap)

FOR SALE—Patent No. 685,288, dated October 29, 1901. Lathe and Milling Machine Indicator. Necessary for accurate work. Useful in every shop. Just the thing for fine tool manufacturers. Address J. C. Miller, Bloomfield, N. J. (ap)

FOR SALE—Patent No. 688,654, dated December 10, 1901. Buckle. Especially intended for trace buckles. Can shorten or lengthen four tugs in one minute. Gives an even strain on the whole width of tug without binding or breaking. Outside smooth. Will not tear fly-nets. Address Langdon & Rydman, Box 192, Missouri Valley, Iowa. (ap)

FOR SALE—Patent No. 688,148, dated December 3, 1901. Fire Place. For neatness, simplicity, durability and economy it cannot be surpassed. Will sell outright or lease on royalty. Address L. B. Arnold, Hanly, Kentucky. (ap)

FOR SALE—U.S. Patent No. 649,646, dated May 15, 1900. Also Canadian patent 73,402, dated October 15, 1901. A double band umbilical truss. Bands are tightened simultaneously in opposite directions. Should find much favor among manufacturers and specialists. Will sell entire right or state rights. For information address D. S. Plum, Pleasant Valley, California. (jy)

FOR SALE—Patent No. 674,026, dated May 14, 1901. Potato Bug Destroying Machine. Gathers the bugs, crushes them, and returns the crushed mass to the earth. No poisons used. Address Charles F. Smith, Melrose, Wisconsin. (m)

FOR SALE—Patent No. 633,612, dated October 1, 1901. Snow plow designed for the clearing of railway tracks. Performs its work with great success. Address James W. Derby, Bowling Green, Ohio. (m)

FOR SALE—Patent No. 668,276, dated February 19, 1901. Portable Post Driver. Useful for general purposes around the farm. Address Mrs. Joseph M. Armstrong, Bonham, Tex. (feb)

FOR SALE—Patent No. 692,493, issued September 10, 1901. Carrying case to hold music, pictures, drawings and the like in a flat position, avoiding rolling or folding the same. Address Emmet Pendleton, Box 183, Red Bluff, California. (feb)

FOR SALE—Patent No. 685,694, dated October 29, 1901. Pipe Union. Can be readily taken apart; will not leak; easily packed; very simple and durable. Address E. W. Buck, Portland, Indiana. (feb)

FOR SALE—Patent No. 685,337, dated October 27, 1901. Apiary providing means for supporting the hives so that they may be inaccessible to insects and small animals and yet readily accessible to the bees. A valuable invention protected by a strong patent. For full particulars address Charles O. Lett, Eclectic, Alabama. (feb)

FOR SALE—Patent No. 651,887. Spring Egg Case. Will sell outright or lease on royalty. The eggs are placed on springs and protected from breaking. Address Jesse P. Riley, Point, Louisiana. (my)

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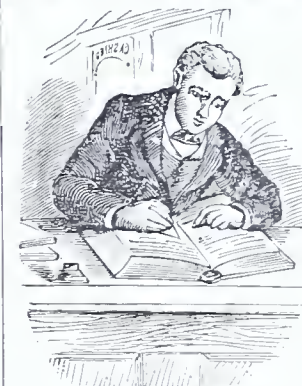
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WASHINGTON, FEBRUARY, 1902.

NEW WONDER BOOK.

World's Fair Classification Shows the
Marvelous Activity of the Human
Race. Every Art and Industry
Has a Place.

An advance copy of the Classification Book for the Louisiana Purchase Exposition at St. Louis in 1903 has been received. Fifty-three pages are required for a mere enumeration of the groups and classes of exhibits. The exhibits of the entire exposition are divided into fifteen departments as follows: education, eight groups; art, six groups; liberal arts, thirteen groups; manufactures, thirty-four groups; transportation, six groups; agriculture, twenty seven groups; horticulture, seven groups; forestry, three groups; mining and metallurgy, five groups; fish and game, five groups; anthropology, four groups; social economy, thirteen groups; physical culture, three groups. The total shows 144 groups and 807 classes, and under each class is a possibility for a multitude of exhibits. Nothing reflects more clearly in so small a space the variety of human occupations or more comprehensively the broad scope of the great exposition which the people of St. Louis are preparing for next year. A place is provided for every conceivable product worthy of exhibition and all nations of the world have been invited to take part. Acceptances have been received from many. The work of construction is progressing earnestly. The buildings will have an aggregate floor space of 200 acres and the grounds a total area of 1,000 acres. The money now available aggregates \$15,000,000 besides \$1,000,000 appropriated by the State of Missouri and various liberal sums from other states. The Classification and the Rules and Regulations of the Exposition will be mailed free on application to the Director of Exhibits, World's Fair, St. Louis

Tobacco Ashes for Stings.

Tobacco ashes are recommended as a simple means to soothe the pains which are caused by the sting of insects. When applied at once, the swelling of the wound and pain caused by the sting, are reduced to a minimum, if not altogether prevented. As a rule, tobacco ashes will be handier than sal ammoniac. Put some ashes from a cigar, cigarette or pipe on the wound, add a drop of fresh water—in case of need, beer, wine or coffee may be used instead of water,—and rub the resulting mass thoroughly into the skin around the wound. The use of fresh tobacco ashes is particularly recommended, as they are stronger and more likely to be free from dirt or dust. The beneficial influence of tobacco ashes is due to their containing potassium carbonate, which, like the sal ammoniac, deadens the small quantity of acids which the sting of the insect injects into the wound.

Fireproof Timber.

The ease with which certain woods are liable to catch fire, leading to great catastrophes and loss of life, has led to many attempts to discover some preventive for the danger which continually threatens the human race. The subject of impregnating the pores of hard wood with some substance not subject to combustion, has long occupied the attention of chemists. Experiments have been made with a great many kinds of paint, but the moment the timber of a dwelling begins to warp and shrink, cracks are formed which at once destroy the value of the protecting coat of paint. It would appear that the firm of Hulsberg & Co., Charlottenburg, Germany, has at last succeeded in making a liquid which is proof against all changes of atmosphere. After the wood has been coated with this liquid, its weight is increased by 20 per cent. Most hard woods can be easily impregnated with this liquid.

Mosquitoes Influenced by Color.

An English physician, Dr. Nuttall, has ascertained through careful experiments that mosquitoes are attracted by certain colors, especially by blue. Their favorite color is marine-blue, but they also like dark red, brown, black, dark green, violet and light blue. Accordingly, in places infested by mosquitoes, in purchasing wall-paper it is advisable to select colors which are disliked by these transmitters of disease. The same precaution should be taken in selecting articles of clothing. For the purpose of combatting these insects, dark blue material may be used as a trap, for upon this they will settle in dense masses.

President Roosevelt's Advice.

A young attorney is said to have recently applied to President Roosevelt for advice, whereupon the latter urged him to "Go out, get a good case, not of the police court kind, study it well, put your whole heart and soul into it, and charge a good fee. When this is disposed of, get another and apply the same treatment."

How nice this sounds, especially

that part referring to the "good" case. That is the most difficult thing usually for the young practitioner. People who are willing or able to pay "good" fees, have a bad habit of selecting the lawyers with big practices. The young lawyer invariably has to start his career collecting bad debts or accepting cases that the big attorneys will not handle. Quite often he has to take whatever fee the party is willing to pay. Evidently the President never "served time" in an attorney's office.

Don't Save Money and Starve the Mind.

How many there are who have been very successful in saving money, but whose minds are as barren of anything beautiful as is the hot sand of the Sahara Desert! These people are always ready to invest in land, stocks, or houses, but are never able to buy books or collect a library.

We know men who started out as bright, cheerful boys, with broad, generous minds, who have become so wedded to money-making, so absorbed in their business, that they cannot find time for anything else. They never travel or visit their friends. They consider it foolish or extravagant to go to the opera or a good play; the daily paper limits the extent of their reading; recreation of any kind is relegated to a far-away future, and yet these men are surprised, when they retire from business late in life, to find that they have nothing to retire to, that they have destroyed the capacity for appreciating the things they thought they would enjoy.—*Success*.

This is sound advice and should be heeded by every one who reads it. The AGE has for several months past been offering, through combinations with representative magazines, means by which those who are unable to buy books and collect a library may, for an inconsiderable sum, obtain monthly a number of the principal magazines at a price which, ordinarily, would only purchase one of them. The advantages of subscribing for a magazine are manifold, and will be made clear by a single instance. The subscription price to the *Cosmopolitan* is one dollar a year, yet if the magazine is purchased singly each month from a bookstore, it costs the purchaser \$1.20 a year. By combining the *Cosmopolitan* with *Success*, *Review of Reviews* and the AGE, these four magazines will be sent to one address, or four different addresses, for twelve months for \$3. The subscription can commence with any number. As the offer may be withdrawn from the columns of the AGE at any time, the opportunity should for this reason be taken advantage of now. See page 16 of this paper for further particulars.

Co-operative Workshops in Germany

While large manufacturing establishments of shoes in Germany are combining, independent shoemakers are seeking to obtain the advantages of production on a large scale without giving up their individuality. A meeting was recently held in Frankfurt to discuss the advisability of establishing a central workshop for

the local shoe concerns, and a committee was appointed to devise a plan. It is proposed to start a factory with the most modern machinery, where every member can have his work done. This is said to be the first attempt in Germany at a co-operative factory. It is stated that work will be pushed, and that the provincial government will materially assist the new enterprise, but in what manner is not divulged so far.

Should Attorneys Advertise.

Is a lawyer entitled to advertise, and if so, when and how may he do it? This is one of a number of questions that, like the poor, "are with us always." Now the term, advertising, embraces, as we all know, a very wide scope. There is on the one hand the individual who describes himself on his cards as "a scar-faced, freckled begrimed legal Napoleon of the slope, gentle as a cooing dove and fierce as the untamed catamount," about whom we heard sometime ago, or that other person whose letter heads bear the legend, "Claims Collected in Cold Blood," with a big splotch of red to accentuate it. On the other hand, there is the individual of the old school who would as soon confess to a homicide as to own that he had allowed his name to get into print, and yet usually this very same person, whenever a bar association meeting or dinner takes place, will be the most strenuous in insisting that the reporters present shall "get his (and his firm's) name right." Then there is the practitioner who, midway between the two, inserts a card either in some legal magazine or in the lay press.

Ninety-nine per cent of attorneys have already abandoned the old-fashioned idea that it is derogatory to a professional man to allow his name to appear in print in the shape of a direct appeal for business. It is now well recognized that unless the average practitioner adopts some method of making himself known to the community, many items of business which would otherwise come to him will be sent elsewhere. Some of the bar associations have taken this matter up, notably that of Wisconsin, which, in its code of ethics, expressly declares that newspaper advertisements, circulars and business cards by attorneys are perfectly legitimate.

The days have passed when the young attorney was supposed to rent an office, and sit in it until somebody came in, dug him out of the accumulated dust of ten years, and asked him to take a case which brought fame and fortune.

The largest firms are constantly adopting all kinds of expedients, one of the most popular of which has been the taking into the partnership of young college graduates with a "pull." The favored young man is usually allowed to blazon his name on the door and so draw summonses and citations occasionally. His salary is a good one, for which he makes due and adequate return in the way of bringing in business. No doubt there is a great difference between the head of the firm of which he is a member, and the "scar-faced, freckled begrimed," etc., and it must be confessed that the former's methods are somewhat the more pleasant of the two.—*The American Lawyer*.

Scientific Progress.

Submarine Boat vs. The Battleship.

[LEWIS NIXON, in February "Success."]

There is not the slightest doubt that, in future warfare on the seas, submarine boats will play a very prominent part. In the system of naval tactics which has been evolved by hundreds of years of sea fighting, these small, inconspicuous boats will bring about changes which will be almost revolutionary. The blockading of ports, as practiced under our present system, will be well-nigh impossible. The immensely wealthy sea-coast cities, which have trembled at rumors of war, because of the likelihood that an enemy would steal up to their doors and destroy them, may put aside their fears. A few submarine boats will be able to clear any harbor of attacking ships of war. Against the stealthy and underhand, but terrifically destructive assault of such a craft, a battleship can have no defense but flight. At Santiago, for example, our men-of-war would never have dared to close in around the mouth of the harbor, if the Spaniards had had three or four vessels like the "Holland" scurrying about and delivering quick and unforeseen blows from the depths of the ocean. A battleship cannot attack one of these naval sharks, for the very simple reason that it presents no target. Be the lookouts ever so vigilant, they cannot, of course, detect an enemy approaching beneath the surface to attack from a water ambushade. No armor plate that has ever been devised is as efficient as a score or more feet of water. Ordinary torpedo nets will give no protection against submarine attack; the assailants will be able to dive under these nets, or send through them a torpedo which will tear a hole large enough to enable the boat itself to pass. I think it is not putting it too strongly to say that, in a harbor protected by submarine boats, blockading, as practiced under the present system, will be a thing of the past. I believe that it will be necessary to devise some type of war vessel to withstand these boats. What type this will be no man can yet say.

New Process in Glass-Making.

A highly interesting departure in the matter of glass-making is now being carried on at the works of the Societe Anonyme de l'Industrie Verriere, Brussels. Hitherto glass has been melted in pots by means of solid, or more recently, gaseous fuel. The temperature required to obtain the glass in a suitable condition for blowing is very great, but is nevertheless often not great enough to make the "metal" so fluid that the glass when cold proves entirely free of bubbles. An electric furnace is now being used at the works referred to. The raw material in the state of powder is fed down past a series of inclined hearths. On its way it passes through electric arcs struck between three sets of carbons. As it passes the first set of carbons, the material is melted and

trickles down the second inclined hearth, and thence between the second series of carbons on to the third hearth. Leaving this, it passes between the third set of carbons, and finally collects in a molten state in a fire-clay tank, which is kept hot by the waste gases which escape from the furnace. The tank used is of small capacity, and the whole operation of melting takes but little time, it being possible to commence bottle-blowing within one hour after starting the furnace. Special care is taken to exclude air from the furnace, and the glass is rendered so fluid by the intense heat to which it is subjected as it passes the carbon electrodes, that it is very completely freed from bubbles before it enters the collecting tank.

Sea Flint Pebbles.

By the action of the sea on the base of the chalk cliffs, which form the coast line of a portion of the Department of the Siene Inferieure, France, fragments of the rock are detached. Those which are composed of the flint found in the cliffs, on account of their hardness, are not reduced to sand by the trituration arising from the movement of the waves or tidal currents, and become what are known as sea flint pebbles. These are gathered on the beach between Havre and St. Valery-sur-Somme, a distance of a little over 100 miles. Those which are nearly spherical in shape are carefully selected and are used in the Alsing system of cylinder grinding, which is becoming so generally employed for pulverizing cement, pharmaceutical and chemical products, etc. The others are bought by the potteries for making ordinary porcelain ware, after being calcined, ground into a fine powder, and mixed with china clay. According to the official custom-house statistics, there were 13,592 tons of flint pebbles exported from France during 1900, valued at \$39,348. The value of the declared exports of these stones from France to the United States for the fiscal year ended June 30, 1900, was \$16,743. The prices of the flint pebbles for use in the potteries range from \$1.27 to \$2.92 per ton.

Manufacture of Alumina.

A new process for winning pure alumina from bauxite has been patented in England. The mineral is mixed with a small quantity of carbon and calcined, and then more carbon is added to bring the total proportion up to 8 or 10 per cent. If the ore is poor in iron, some ferric oxide is introduced, and in certain cases a flux, *e. g.*, fluorspar, lime, cryolite, or soda is added. With or without these ingredients, the mixture of calcined bauxite and carbon is incorporated with a certain proportion of aluminum powder for the purpose indicated below, the proportion of metal being regulated to suit the percentage of ferric oxide, silica, and titanitic acid occurring in the original bauxite; and the whole is fused at an elevated temperature, or for a considerable time in an electric furnace. The added aluminum combines with the iron, silicon and titanium of the mineral to form an alloy which sinks to the bottom of the bath, and is subsequently

removed through a tapping hole. The material remaining in the furnace is pure alumina free from sodium. It is allowed to cool, reduced to powder, freed from metallic particles by magnetic treatment, and finally converted into metallic aluminum by the regular electrolytic method at present employed.

Wave Motors and Buoy Lighting.

Many wave motors have been invented, but, singularly enough, nearly all of these have failed to come up to the requirements expected. It has been said that if the power of the waves could be stored up, we would soon have sufficient energy at our command to operate railroads and factories without trouble. One of our summer storms creates enough energy in the waves to supply power for the whole United States for an indefinite period. Indeed our winter ocean is a scene of almost constant wave motion powerful enough to generate electrical energy for all industrial purposes. But the difficulty has always been how to harness and store this immense waste energy.

There have been several experimental motors built along the coast by Government experts, and by private inventors, anxious to sell their patents to the Lighthouse Department. These motors aim merely to collect sufficient power to generate a small current. In the case of buoy lighting there is a small motor, which derives its motive power entirely from the waves. The plan is to connect a series of such electric buoys by wires with the nearest lighthouse, so that the keeper of the latter can turn on the light at night-time along the whole circuit. Where the small motor is attached to a single buoy, the light is supposed to burn all the time, night and day; but as the energy of the waves costs nothing, the waste of the light in the daytime is of no consequence.

Should the present wave motors of this class prove successful, the Lighthouse Department will probably adopt electricity for buoy lighting all along the coast. If the government can be put in possession of some method of utilizing the wave power of the ocean for electric generation, the whole system of beacons, buoys, and lighthouses will be revolutionized. Meanwhile, it is a subject full of interest and promise to inventors who have mastered the details of this branch of electric development.

Drying Beet Pulp.

A new method of drying sugar-beet pulp which has been freed from its contents of sugar has lately appeared in Germany. In the old system, which for sometime has been used with success in more than a hundred German sugar factories, the pulp is dried by means of hot gases, which accompany the pulp in a parallel stream. The inventor of the new method, the owner of the machine factory of J. Sperber, in Vienna, starts with the supposition that pulp which is dried by heat from a fire must be more or less soiled by the particles of ash which come from the used-up fuel, and must, therefore, be highly injurious to the animals consuming it—a supposition entertained by many, which has, however, never been proved in practical use to be correct.

Sperber, therefore, dries with steam.

The pulp is first cut up by machines into small pieces about one-tenth of an inch thick and one-tenth of an inch long, which are passed into an apparatus where they are tossed to and fro by means of shovel-like implements; afterwards coming into contact with movable hollow bodies, through which steam flows. By this means, the small particles gradually lose their contents of moisture. The damp air is carried off by an exhaust-er which creates a small vacuum (exactly regulated by the exhaust-er); and this also aids in desiccating the pulp. When the process is completed, the pulp is freed from the machine by means of a screw conveyor and is raised up to a funnel to which sacks, for the reception of the dried pulp, are fastened.

Petroleum Briquettes.

Briquettes made with petroleum have been manufactured in various ways in different countries, notably in Russia, France and the United States, as a combustible for steamships and for certain industries where rapid production of heat is desirable.

The advantages of such a substitute for coal are readily apparent—less storage room, complete combustion, etc. It is surprising that petroleum has not been utilized more generally in this form. The objections are that the briquettes injured the boilers after a short time, by reason of some chemical action produced by combustion; further, the blocks did not keep their form under the action of the heat, but fell through the fire box in a liquid state; and the price is stated to be two-thirds more than that of coal.

A company has recently been formed at St. Etienne, France, for the manufacture of petroleum briquettes, which claims to have obviated all the objections except that in regard to price. The advantages of the product are set forth as follows:

The briquette is composed of 97 per cent of petroleum and 3 per cent of hydrocarbon. The volume being equal, it weighs only half as much as coal and gives but from 2 per cent to 3 per cent of residue; it produces no slag; it does not "run" when lighted and keeps its form like coal; it burns without odor and without smoke; it may be wetted with impunity, losing none of its properties; it consumes without explosion or sparks and yet with a bright and long flame; it may be kept indefinitely without deterioration. By this process, a degree of saponification is obtained, by which the briquettes are rendered unchangeable even to the extent that if a projectile should enter a ship's bunker filled with this fuel, there would be no danger whatever of explosion; the effect being the same as in the case of ordinary coal.

The average heating power is from 12,000 to 14,000 calories, and the briquettes can be employed in any fire box or in any grate for domestic purposes.

The manufacture of these briquettes is very simple and requires but little machinery. If necessary, the petroleum contained therein can be recovered, with a loss of only 5 to 7 per cent.

CLASSIFIED list of Patents issued during the month appears in each issue of the **INVENTIVE AGE**, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies for \$1.50.—Please give correct data in ordering.—Address
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 Pulley lubricator. Loose. F. J. Rippl
 Pulp engine. W. N. Sherwood
 Pump. Differential. E. M. Coryell
 Punching bag platform. G. Yoerger et al
 Punching machine feeding mechanism. W. F. Siegener
 Purse or bag frame. B. vom Eigen
 Purse or bag frame. A. F. Fuller
 Rail chair and joint. B. H. Tripp
 Rail cleaner. A. Rom
 Rail frog. Continuous. E. S. Eberlein
 Rail joint bridge plate. F. E. Abbott
 Rail systems. Mechanism for raising contact shoes on third. S. H. Libby
 Railway. Electric. R. Bingham et al
 Railway switch. G. L. Warren
 Railway tie and fastener. Metallic. T. F. Mason
 Railway tie and means for securing track rails to same. Metallic. C. Buhner
 Railway tie plate. J. W. Stephenson
 Receptacle or crate. W. O. Anderson
 Refractory materials for building or other purposes. Manufacture of. A. G. Salamon
 Riding habit. J. A. Ondrak
 Riding or cycling habit. Combined. J. A. Ondrak
 Road roller. Steam. 2 pats. C. L. Heisler
 Rope socket. L. C. Sands, Jr
 Rotary engine. A. Guindon
 Rotary engine. F. Meyer
 Rotary engine. J. J. Unbehnd
 Rubber ball and manufacturing same. H. G. Berstorff et al
 Rudderbrake. J. S. W. Grenfell
 Sad iron. F. Collins
 Sash attachment. Window. L. E. Tranter
 Sash pull and safety guard. Combined. F. A. Chandler
 Saw mills. Log loader and stop for double cutting band. E. E. Thomas
 Saw set. S. Halton
 Saw setting machine. W. L. Holcomb
 Sawing apparatus. F. Linquist
 Scale. O. O. Ozias
 Scoop board. A. N. Jordan
 Scuttle. J. Formes
 Seal. Car. J. H. De May
 Seal. Car. S. F. Estell
 Seal. Car. A. H. Pierce et al
 Seed hull press. Cotton. W. P. Williams
 Semaphore operating device. J. Shoecraft
 Separable ring. C. A. Kellogg et al
 Sewing machine bar stitch attachment. R. G. Woodward
 Sewing machine buttonhole attachment. W. H. Hargraves
 Sewing machine feed mechanism. E. Normancut
 Sewing machine. Hemsitch. A. J. A. Osterreich
 Sewing machine presser bar clamping mechanism. R. G. Woodward
 Sewing machine spool holder and tension device combined. A. I. Jacobs
 Sewing machine tension device. T. O. Quist et al
 Sewing machine thread controlling mechanism. H. A. Klemm
 Sewing machine thread cutting attachment. J. M. Gileckman
 Sewing machine tuck folder. A. Laubscher
 Shade adjusting device. Window. J. H. Brown
 Shade roller bracket. J. C. Wilson
 Shafts or mandrels. Device for fastening collars, pulleys, or the like on. A. E. Whitehouse
 Sheet metal or material. Dovetailed. A. E. Brown
 Shutter operating device. Window. E. L. Schwanengel
 Sign supporting stand. S. L. Davis
 Siphon. D. A. Kreider
 Skinning or winding machine. J. H. Young
 Skins. Producing imitations of Crimean or Persian curl upon. S. Lewin
 Sleeper. Metallic. C. G. Vachon
 Smoke consumer. R. Schulz
 Smoke consuming and fuel saving device. A. Z. Germain
 Soldering bottoms or tops of tin cans, &c. Apparatus for. E. Besse et al
 Soldering iron. T. E. Lee
 Sole trimming machine. E. E. Angell
 Sound record and making same. E. Berliner

Sound records. Apparatus for duplicating or multiplying. G. Bettini
 Sound records. Apparatus for producing. E. Berliner
 Spinning spindle. W. G. Morrison
 Spittoon. S. L. Feathers
 Split machine. H. L. Beck
 Spoke and tire tightener. F. E. Rew et al
 Spool stand. E. Schottenfels
 Stacker. Pneumatic. J. G. Taylor
 Stamp mill. W. E. Parnell et al
 Stamp. Steam. E. S. Brett
 Stave jointing machine. J. P. Rust
 Steam overheating apparatus. B. F. Bastiansen
 Steel or iron sawing machine. Cold. J. Hill
 Steering engine. Vessel. F. B. Turner
 Stills. Rectifier for spirit. R. Leyer
 Stool. Dovetional. C. M. Dungan
 Stop motion finger. C. L. Healey
 Stove. Gas. H. Alder
 Stove. Gasolene or gas. G. R. Moon
 Stove generator. Vapor. I. Kinsey
 Stove or furnace. Heating. E. J. Lansing
 Stove or furnace. Heating. O. P. Mason
 Strop. Swing. J. R. Torrey
 Suit case clothes holding device. S. Kiefer
 Swimming device. B. J. Hooper
 Syringe nozzle. R. Parker
 Teeth. Fastening for artificial. A. Bischoff
 Telephone cable fire protector. F. D. Saylor
 Telephone system. Elective. J. V. Stout
 Telescope. Water. W. M. Parrish
 Templet for the manufacture. of cuffs, &c. J. I. McDonald
 Thill coupling. M. E. Covey
 Thill coupling and detach. G. H. Tatge
 Thread, cord, &c. Finger device for cutting. J. H. Polhemus
 Threshers. Machine for rethreshing the tail-ies in. M. S. Bowers
 Threshing machine. J. Lindner
 Tie plate. J. N. Hayes
 Time alarm. Incased electric. A. P. Schloss
 Time check. F. H. Gilson
 Time switch. Automatic electromagnetic. J. Sachs
 Tire and means for securing it on wheels. P. W. Tillinghast
 Tire. Elastic. T. Gare
 Tire repairing tool. B. J. Piquet
 Tire. Vehicle. E. C. & F. P. Whitaker
 Toaster. Bread or other. Z. T. Hall
 Torch. M. M. Carr
 Torpedo. Railway. M. M. Carr
 Toy for playing at target marbles. E. Bauer
 Trace hitcher. W. W. Meredith
 Track layer's instrument. L. B. Clark
 Traction wheel. G. A. Tauer
 Tray holder. M. Hol
 Trolley. T. McWilliams
 Trolley catcher. C. B. Robertson
 Tunnels. Means for ventilating. C. S. Churchill et al
 Type case. W. A. Watson
 Type or matrices. Apparatus for provisionally separating lines of. H. Burg
 Type writing machine. C. H. Shepard
 Umbrella. Folding. J. M. Shaffer
 Valve. Automatic. W. J. Collins
 Valve. Boiler feeder. G. R. Ford
 Valve. Centrifugal machine. G. Engel
 Valve for explosive engines. Controlling. J. Walrath
 Valve movement. Steam engine. C. C. Worthington
 Vegetable cutter. L. Ziegelmeyer
 Vehicle. G. J. Quinsler
 Vehicle brake. Automatic. J. W. Rowe
 Vehicle fender. W. A. McGuire
 Vehicle front gear. C. G. Streich, Jr
 Vehicle gear. H. F. Weeks
 Vehicle gear. Short turning. W. A. Koon
 Vehicle. Motor. F. F. Dorsey
 Vehicle. Motor. 2 pats. J. T. Hill
 Vehicle spring draft attachment. S. V. Graves
 Vehicle. Steam propelled. S. Straker
 Vehicle wheel. R. O. Suismann
 Vehicle wheel. Roller bearing. M. G. Bunnell
 Vehicles. Feeder for motor. W. J. & G. Lane
 Vending machine. Coin controlled. D. A. Buck
 Vending machine. Coin operated. M. B. Mills
 Viscose. Preparing. C. N. Waite
 Viscose. Treating. C. N. Waite
 Vise. Carpenter's floor. W. J. Young
 Wagon brake. G. W. Sutton
 Wagon. Dumping. M. M. Collins
 Wall flange. W. A. Russel
 Warp threads. Means for correcting imp oper registry of party colored. H. Hardwick
 Warping machine. W. J. Garboly
 Watch plate. R. L. Peabody
 Water closet. J. Reid et al
 Water tube boiler. H. Garbe
 Water tube boiler. J. Q. A. Moore
 Weather strip. C. Vose
 Weighing apparatus combined with a barrow. H. David et al
 Welding rings. Rolls for 2 pats. G. W. La Voo
 Whiffletree even. R. P. Brigham
 Whistle. Bicycle alarm. L. L. La Mere
 Wick. Lamp. H. Sarafian
 Window. J. A. Caesar
 Wire fabric. Machine for making coiled. 2 pats. J. F. Gail
 Wire stretcher. M. D. Ferrin
 Wire tightener. L. F. Tarbell
 Wood impregnating apparatus. G. F. Lebiolla
 Wood. Preserving. O. Chanute
 Woodworking machine. R. Schiecher
 Wrapper. Reversible mailing. G. Schutes
 Wrench. T. W. Suider
 Zinc from lead. Removing. J. Barton et al
 Zither. Lyre. V. Eckhart

DESIGNS.

Bottle. F. F. Garrard
 Buckle. B. F. Hecht
 Button. Cuff. M. Wetzler
 Candelabrum. S. W. Babbitt
 Clothes pin. A. Smith
 Drill bit. F. H. Geckell et al
 Fencing. Wire. J. W. Dwiggin et al
 Hose rack frame. E. Cliff
 Insulator. Electric wire. T. F. King
 Milling machine frame. J. Becker
 Milling machine upright. Horizontal. J. Becker
 Range. Portable. 2 pats. T. I. Rankin
 Stove. Cooknig. 2 pats. T. I. Rankin

Stove. Heating. 3 pats. T. I. Rankin
 Tool. Hand. I. L. Clements
 Toy hoe and rake. H. T. Kingsbury
 Toy rake head. H. T. Kingsbury
 Velvet smoother. H. Keadstrom
 Wrench. Hub. A. P. Smythe

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Adding machine. F. A. Worden
 Adjustable wrench. J. C. Burgess
 Advertising device. F. L. Perry
 Air brake. G. L. Colledge
 Air compressing and cooling apparatus. R. Berg
 Air compressor regulator. W. Prellwitz
 Amalgamator and concentrator. I. H. Sorrigs
 Amalgamator. Concentrating. A. M. Horton
 Ammonia for waste products. Making. E. R. Besenfelder
 Angling device. W. C. Kepler
 Animal rack, hay rack, and wagon body. Combined. W. P. Ley
 Animal trap. R. J. Douthett
 Annealing box. P. Meehan
 Anvil mechanism. T. F. Rowland
 Auger holder. P. Theobald
 Automatic brake. J. Hughes
 Automobile driving gear. J. Ridley
 Automobile. W. E. Stirling
 Axle. J. S. Taylor
 Bag holder. J. L. Herr
 Baling press. J. V. Jones
 Baling press. J. C. Tom et al
 Ball mixing and discharging apparatus. C. Duhamel
 Bandage. Suspensory. L. Rogers et al
 Basket. J. I. Lane
 Bearing adjuster for connecting rods. C. E. Kester et al
 Bed pan. Side. S. C. Wolfskill
 Belt shifter for embossing presses. M. L. Bristol
 Bending machine. E. Einfeldt
 Bicycle. C. L. Horack
 Bicycle driving mechanism. J. S. Copeland
 Bicycle frame. J. S. Dikeman
 Bicycle support. J. De Intinis
 Bicycle support or rest. O. H. Barry
 Bicycles, &c. Brake for. W. B. Gorvett
 Binders or headers. Pneumatic attachment for. E. Hafermehl
 Blackboard. S. Collins
 Blasting agent. H. von Dahmen
 Boiler flue coupling. G. L. Autenrieth
 Boiler furnace or flue. Corrugated. J. Nodder
 Boiler furnace. Steam. J. Van Develde
 Bolster. Body. A. H. Hagemeier
 Book rest or holder. A. B. Shaw
 Boots or shoes. Machinery employed in the manufacture of. J. M. J. A. & S. A. Gimson
 Bottle carrier. W. D. Snow et al
 Bottle. Non refillable. J. J. Brown
 Box. J. H. Greenstreet
 Box or package blank. W. J. Walker
 Brake. F. C. Taylor
 Brake shoe. J. D. Gallagher
 Brake shoe. H. Jones
 Brick cutter. S. McAdoo
 Brush. J. W. Kales
 Brush and polisher for windows. Four tain. J. C. Cramer
 Buckle. Harness. E. C. Bruner
 Building block. S. T. Trumbull
 Burglar and fire alarm. L. H. Williams
 Burner. H. E. Gray
 Burner. F. F. Dow
 Burners and mantle supports. Cap for. M. Herskovitz
 Button. Ornamental. J. Derus
 Cabinet for small articles. J. Hoult
 Cable coupling. Wire or other. J. E. Gamlielson
 Calculating machine. C. E. Locke
 Calipers and dividers. C. E. Bickel
 Camera. Photographic. H. B. Carlton et al
 Cameras. Plate feeding mechanism for. H. O. Foersterling
 Candle holder and save all. W. Dall
 Cane loader. Sugar. A. H. Schierholz
 Canteen and making same. Enameled army. M. E. Erwin
 Car brake. L. De Intinis
 Car. Convertible dump. H. S. Hart
 Car coupling. B. F. Haugh
 Car coupling. E. C. Staudinger
 Car door. R. Mobley
 Car end sill. R. V. Sage
 Car fender. L. C. Stin
 Car step. Folding. M. Weber
 Carbureter. J. G. Clark et al
 Card or photograph holder. L. E. Parker et al
 Cartridge capping or decapping machine. J. H. Barlow et al
 Caster. Furniture. W. Livingstone
 Casting or pig metal. Apparatus for the continuous. J. M. Hartman
 Ceiling construction. Straight. C. Lorenc
 Celluloid records. Manufacturing. F. L. Capps
 Centrifugal distributor. H. W. Blaisdell
 Centrifugal extraction. J. J. Berrigan
 Centrifugal machine. 2 pats. J. J. Berrigan
 Centrifugal separator drum. F. O. Nilsson
 Chart. Adjustable. W. McDowell
 Cheese cutting apparatus. Computing. W. M. Evans
 Cigarette cutter. F. P. Hermida
 Cigars from original boxes. Machine for vending. O. Smith
 Clavier. Practice. A. C. Bergman
 Clock. G. W. Adams
 Clothes tongs. E. W. Lammers
 Clutch. Speed regulating. H. S. Credleburgh
 Cocks. Means for electrically controlling gas. H. Borchardt
 Coop. Folding poultry. W. H. Hodges
 Copper from ores. Extracting. G. H. Waterbury
 Cornucop pipes. Machine for pressing plastic material into the interstices of. R. R. Purves
 Counting or adding apparatus. E. Moriarty
 Crane cut out. G. A. Hassel
 Crate for shipping globes. J. N. Hahn
 Crate form. E. Decow et al
 Cue, Spring. H. L. Haskell
 Cultivator. J. McKibbin

Cultivator cotton chopper attachment..... J. J. Vickers
 Currents into continuous currents and inversely. Apparatus for transforming single and multiphase alternating..... R. Rouge et al
 Currycomb..... I. E. Spangler
 Curtain hook..... J. Boyd
 Curtain pole..... M. J. Triece
 Dental tool..... S. W. Platt
 Dentist's cabinet..... W. G. Hullhorst
 Diffusion process..... E. B. Williams
 Display card for pencils, &c..... E. E. Blakeslee
 Distilling apparatus. Sawdust..... E. S. Hutchinson
 Distilling, drying, and evaporating machine. Continuous vacuum..... J. A. Wathen
 Door hanger..... J. Handschumacher
 Door hanger..... J. E. Ahlvin
 Door support..... J. Goettler
 Draft equalizer..... C. G. Holzworth
 Drawers, boxes, &c. Clip or holder for fronts of..... S. T. Trott
 Drawing table..... H. A. Davis
 Drill frame. Post..... A. Walker
 Drying apparatus..... C. H. Fish
 Eaves trough hanger..... F. L. Burch
 Electric battery..... T. J. Bain
 Electric cable and manufacturing same..... G. E. Heyl-Dia
 Electric circuit controller..... W. K. Bassford, Jr
 Electric circuits. Limiter or interrupter for..... R. J. Patterson
 Electric controller lock..... W. K. Bassford, Jr
 Electric cut-out..... A. D. Wheeler
 Electric elevator..... J. W. Moore
 Electric light, telephone or telegraph pole. Sectional..... W. B. Crossland
 Electric reel. Automatic compensatory..... R. L. Montagu
 Electric wire or cable conduit..... L. Cunningham
 Electrical device..... S. C. Harris
 Elevator..... 2 pats. M. E. Neenan
 Engine cylinders. Apparatus for cooling explosive..... J. A. Secor
 Engine frame..... J. A. Secor
 Engine indicator. Steam..... J. C. Dobbie
 Engine stop mechanism..... W. F. Bradbury et al
 Engines. Electric igniter for explosive..... J. B. Boisselot
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 Exercising device..... E. Perry
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 Exhibiting minatures. Device for..... L. J. Dirand
 Extension screen..... H. A. Way
 Eyeglasses..... E. B. Howitt
 Eyeglasses..... G. W. Wells
 Fabric edging..... L. B. Purinton
 Fabrics. Making multicolored..... F. Meyer
 Fanning mill..... C. H. Michael
 Farm gate..... J. L. J. Downen
 Faucet. Measuring..... J. P. Dobbyn
 Feed gate..... C. H. Fish
 Feeding water into boilers. Apparatus for..... E. Shackleton et al
 Felt..... A. Fusai
 Fence pickets. Machine for making wire..... W. C. Smith et al
 Fence stay. Wire..... S. C. Davis
 Fencing. Machine for making wire..... W. C. Smith et al
 Fifth wheel..... G. Benjamin
 Fire alarm..... A. W. Hansen et al
 Firearm illuminator..... F. D. James
 Fire escape..... T. Brown
 Fire extinguisher..... R. O. Jones
 Flushing tank..... J. W. Snider
 Forging nuts, &c. Machine for..... A. M. Reynolds
 Fracture apparatus..... J. W. Pettie
 Frame forming bracket..... J. Wilding
 Furnace fuel feeding mechanism..... W. McClave
 Furnace grate..... W. McClave
 Furnaces. Apparatus for feeding fine fuel into..... G. S. Emerick
 Furnaces. Iron notch for blast..... J. M. Hartman
 Gages. Apparatus for the production of accurate..... O. Eckelt
 Garment press..... C. M. de Forest
 Garment Sanitary..... G. Turner
 Garment supporter..... J. J. Bloom et al
 Gas burner. Incandescent..... W. H. A. Sieverts et al
 Gas generator. Acetylene..... C. E. Colomy
 Gas generator. Acetylene..... C. Seibelle
 Gas generator. Acetylene..... T. A. Bryan
 Gas lighter. Catalytic..... W. H. Porter
 Gas lighting means..... 2 pats. H. Borchardt
 Gas motor. Explosive..... E. Caillavet
 Gas producer..... W. Swindell
 Gas producer..... H. Hyatt
 Gas reversing valve..... E. J. W. Richards et al
 Gate..... D. W. Myers
 Gauntlet..... E. L. Meyers
 Gelatin yieldable liquid from fish &c. Obtaining..... E. R. Edson
 Glass silvering apparatus..... C. Laval
 Gold recovering apparatus..... O. M. Eawrence
 Gold saving apparatus..... C. G. Hambleton
 Governor stop attachment. Steam..... W. Kitts
 Grading and dirt loading machine. Self-propelling..... G. F. Conner
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 Grain drill or seeder..... T. Carney
 Grain separator and threshing machine..... O. & S. McIntire
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 Grease from garbage. Extracting..... S. H. Brown
 Gun barrel..... W. F. Markham
 Gun barrels. Manufacture of rifled..... W. F. Markham
 Gun sight..... S. E. Fischer
 Hammer. Stone mason's..... A. Gade
 Hanger apparatus..... C. H. Scammell
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 Harvester attachment..... J. H. Marshall
 Harvester. Corn..... T. A. Perry et al
 Harvesting machine cutting machine..... S. Baringer
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 Heating apparatus..... A. Karst
 Hog ringer..... W. A. Holland
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 Hoop machine. Wire..... A. F. Dice
 Hopper gate. Double door..... E. T. Williams

Horseshoe..... W. Tharby
 Horses. Means for restraining..... S. S. Stewart
 Hose reel..... G. D. Gibbs
 Hub..... O. F. Miller
 Hub. Vehicle..... A. R. Braden
 Hull construction..... C. H. Howland Sherman
 Hydrocarbon burner..... A. Braun
 Ice cream can..... J. Quinn
 Ice cream cutter..... H. Newcome
 Ice cream freezer..... H. G. Cordley
 Incandescent mantles. Means for transporting..... C. Rogers, Jr
 Indicator..... P. A. Smith
 Inflatable roller..... M. Johnson et al
 Insulation. Apparatus for covering electric conductors with..... G. E. Heyl-Dia
 Interrupter..... T. W. Topham
 Ironing board support..... J. H. Smith et al
 Jar cover fastening. Fruit..... I. P. Doolittle
 Joint guard..... C. B. Whitney
 Kitchen table. Extension top..... W. C. Organ
 Knife..... R. Papendell
 Knife cleaning machine..... H. Shaw
 Lace stretching frame..... C. E. Hobbs
 Lamp. Gasoline..... F. E. Shortt
 Lamp lenses. Adjustable support for..... W. H. Kimball
 Lamplighter. Time..... O. V. Sigurdsson
 Lamp. Pitsafety..... E. Simon
 Lamp. Wax burning..... A. J. Fursall et al
 Lantern. Signal..... E. Noble
 Lathing machine..... D. Schanzer
 Leather wringing machine..... A. E. Whitney
 Linotype machine..... G. A. Vassberg
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 Looms by the quantity of weft in the shuttles. Mechanism for controlling..... J. H. Klerz
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 Match making machinery..... J. H. & E. L. White
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 Mirrors with translucent color decorations. Manufacture of..... 2 pats. E. Wagner et al
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 Molding machine..... J. T. Rowlands
 Motion imparting apparatus..... W. H. Baxter
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 Needle threader..... J. R. Holt
 Nickel salts. Producing..... H. A. Erash
 Nut lock..... I. M. Channell
 Nut or die and common nut. Combined internal threading..... A. E. & C. H. Mann
 Oil from fish, &c. Extracting..... E. R. Edson
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 Organ. Reed..... A. L. White
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 Painting apparatus. Dip..... W. H. Orcutt et al
 Paper bag holder..... C. F. Francisco
 Paper bag machine..... F. Tyson
 Paper bags. Manufacturing square bottom..... C. F. Schmelz
 Paper bags. Manufacturing square bottom..... W. A. Lorenz
 Paper making machine..... M. D. Kenney
 Paper pail..... J. J. Lanzit
 Partition or wall..... H. E. Sharp
 Pasting device for printing presses..... J. J. Walser
 Perfecting press tripping mechanism..... R. Miehle
 Perforating and clenching device..... F. L. Gregory
 Photographic roll holder..... J. A. Robertson
 Picture backboards, &c. Machine for making..... L. A. Deuther
 Pipe coupling..... J. H. Bickford
 Pipe joint..... G. F. Ryan
 Placket closing device..... H. D. Schutte et al
 Planter check row attachment. Corn..... E. C. Roberts
 Planter. Cotton seed..... S. T. McKnight
 Plants. Composition for preserving..... J. M. Howard
 Plow..... C. W. Carraway
 Plow. Cultivator..... M. M. Ritch
 Postmarking and stamp canceling machine..... E. L. Howard
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 Rails. Fastening ring for flat bottomed..... C. Chenn et al
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 Railway carriage door..... A. Maurer
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 Saw swage..... J. F. Bryan
 Scaffold bracket..... F. Ewing
 Scale..... J. F. Lawrence
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 Skirt supporter and waist distender..... M. C. Becker
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 Soda water fountain..... C. Smith
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 Spinning fibrous materials..... A. Metcalf
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 Stacking loose hay or straw. Device for..... R. Griswold
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 Swimming appliance..... O. Jensen
 Switch and outlet box..... M. Robinson
 Syringe..... A. W. Hitt
 Tanning..... B. & B. Allen, Jr
 Telegraph. Electric..... H. A. Rowland
 Telegraph key. Portable..... C. Shirley
 Telegraph. Multiplex printing..... H. A. Rowland
 Telephone indicator..... S. J. Ballard
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 Thread cutting die..... J. G. Spear
 Threshing and separating appliance..... J. D. Hawes
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 Truck. Electric..... T. F. Rowland
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 Twine. Apparatus for making grass..... G. A. Lowry
 Twisting machine. Cotton silver..... G. D. Brownell
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 Utensil guard..... H. R. Barnard
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 Vapor generator..... A. Schaffke
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 Ventilating apparatus..... P. Morill
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 Violin mute..... J. H. Fischer
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 Watch. Stop..... E. H. Johnson
 Water closet..... W. H. Lloyd
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 Wax. Manufacturing mineral..... E. vin Boyen
 Welts or rands. Attachment for applying..... W. B. Arnold
 Wheel rim turning machine..... E. Einfeldt
 Wheel support. Reducing..... F. L. Wolfe
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 Wire coiling device..... A. S. J. Haygood
 Wire crimping tool..... M. Church
 Wire machine. Barbed..... W. Emery

Wood bending machine..... J. W. Lambert
 Wood, &c., into small chips. Machine for cutting..... J. W. Cortis
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 Wrench handles. Construction of..... F. Searle
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 Cabinet. Jeweler's..... S. Swartchild
 Can or jar..... W. A. Lorenz
 Comb..... W. B. Allen
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 Couches or beds. Frame for extensible..... A. De Piniec Mallet
 Cushion..... C. W. Meinecke
 Display tray..... A. J. Springer
 Flower or shrubbery support..... M. A. Glentzer
 Hub. Vehicle..... T. G. Mandt
 Hydrocarbon burner..... L. G. Heist
 Jar. Milk..... G. N. McDonald et al
 Kitchen vessel..... G. Gnuchtel
 Knife handle..... O. Maussner
 Label case. Druggist's..... A. S. Baird
 Lamp. Gas..... A. H. Humphrey
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 Retinoscope member..... T. H. Bickerton
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 Sandal..... M. L. Hatheway
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Harrow..... J. Smith
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Heater..... J. L. Friedman
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Hoist. Fluid pressure..... G. Schuhmann
Hot pad..... J. Campbell
Hot air furnace..... W. A. Disotell
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Vehicle spring..... A. B. Histan
Vending machine..... H. S. Mills
Vessel unloading apparatus..... G. P. Wetmore
Vise..... V. J. McDonnell
Wagon body..... W. Leppert
Wagon. Dumping..... M. G. Bunnell
Water closets, &c. Means for operating..... E. P. Sands
Water coolers. Machine for making..... E. J. Whiteboile
Water heater..... E. W. T. Richmond
Waterproof and air tight fabrics. Making..... W. A. Durrin
Well flooder. Oil..... C. C. Howell
Well standing valve..... H. Bickel et al
Wells. Split expansion bit for drilling oil..... A. B. Burt
Wire stretcher..... W. C. Matthews
Wooden box..... E. Mayer
Wool. Device for removing burrs from..... L. Offermann
Wrench..... F. Bottomly
Wrench..... J. L. Robinson
Wrench..... W. A. Wolfe
Yeast..... G. Heilenman
Zinc from waste products of roasted pyrites. Extracting..... C. Rellner

DESIGNS

Badge..... V. C. Ruggles
Basin inlet. Catch..... A. W. Kurz
Bath tub trap..... F. A. Radcliffe
B-stead..... E. J. Barcalo
Boilers, &c. Cover plate for..... C. B. Fairweather
Bolt..... E. T. Gilbert
Book. Bill..... M. L. Schultze
Bottle..... W. F. Berman
Bottle stopper attachment..... A. Heunsich
Boxes. Telescoping cover for packing and display..... 3 pats..... B. B. Goldsmith
Burner casing..... W. Hawks
Button..... O. Davis
Carton blank..... H. D. Perky
Chafe iron..... E. A. Jones
Chafing dish lamp supports. Bracket for..... M. Seips
Chafing dish stand..... G. E. Savage et al
Chicken fountain..... G. L. Fisk
Cigar wrapper cutting and rolling table..... N. Du Bruil
Cigar wrapper cutting platen..... N. Du Bruil

Cushion, Invalid..... C. W. Meinecke
Die section..... E. H. Smith
Dust pan..... C. J. Gray
Engine cylinder head and chest..... R. E. Olds
Engine or motor frame..... E. V. Dittlinger
Eraser, Rubber..... 2 pats..... B. B. Goldsmith
Feather duster..... J. H. McConnell
Ferrule..... W. Cronk
Flue cleaner blade..... G. E. Shirley
Gasket or packing..... F. Conlin
Grate, Fireplace..... H. A. Starr
Harness loop..... J. Reichert
Lamp..... C. W. Beck
Limp prop bracket..... A. W. Miller
Milk cooler aerators, Cooling drum for..... A. Wisner
Nipple..... A. McMurtrie
Printer's frame or casing, Check..... L. M. Todd
Pump member, Balance..... T. H. Schmutz
Puzzle box or case..... F. Vogel-gesang
Rasp or file handle..... J. R. Frye
Sewing machine loop taker..... P. Diehl et al
Sewing machine needle..... F. W. Merrick
Sewing machine table top..... F. F. Savage
Shoe vamp blank..... H. L. Evans
Speculum blades, Blank for ear..... H. Pedretti
Spoons, forks, &c. Handle for..... A. G. Rogers
Spring..... F. F. Keeler
Stock..... 2 pats..... F. A. Schaefer
Strap end attachment..... D. McMillan
Throat bann..... M. B. Draper
Trousers hanger..... J. B. Hough
Vending machine case..... M. F. Price
Vending machine merchandise chute..... M. F. Price

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Accounts, System of keeping, E. R. Edwards
Acetone, Making..... J. L. Hawliczek
Air conducting tube..... F. Line
Auricular instruments, Transmitting and receiving tube for..... A. G. House
Autographic register..... T. F. Schirmer
Automatic brake..... M. A. Beck
Awning..... C. H. Hansen
Axle shaping machine..... G. A. Eusign
Bag machine..... G. R. Ward
Bag or satchel lighting device..... W. W. McCormick
Ballast conveyor and leveler..... G. F. Spurlin
Battery end cell switch indicator..... A. C. Walther
Battery glate, Secondary..... B. Kuettnier
Bearing, Electric motor shaft..... S. H. Short
Bearing, Roller..... F. W. Thomas
Bearing, Roller..... F. Whitney
Bed and invalid chair, Combined spring..... J. H. T. Edwards
Belt..... J. Loeffelholz
Bicycle..... H. Jarvis
Bicycle seat..... H. Jarvis
Bicycle support..... V. M. Gabrielle
Billiard cue bridge..... S. Ruhland
Billiard cue tip..... F. L. Robinson
Binder..... H. H. Hoffmann
Binding or edge protector and making same..... A. S. Kronold
Bismuth oxydiod methylene digallate and making same..... S. L. Summers
Bismuth oxydiods, Making methylene digallate of..... S. L. Summers
Blackening or coloring boots or shoes, Device for..... F. Gibberd
Block or tile for partitions, walls, &c..... W. A. C. Waller
Boat, Life..... A. Aurep
Boat, Life..... R. D. Mayo
Boiler..... C. J. Cronin
Boiler setting..... G. L. Norman
Boiler tube cleaner..... M. Snyder
Bottle filling and capping machine..... T. L. Valerius
Bottle, Non-refillable..... O. E. Blaine
Bottle top, Tooth powder..... H. B. Kent
Bottle washing machine..... W. B. Cobb
Boxing machine..... F. W. Wild, Jr
Bracelet, Elastic chain..... J. Kun
Brake..... T. G. Blatch
Brake beam..... 5 pats..... J. H. Baker
Brake block for vehicles, Adjustable..... N. Lifton
Branding animals or packages, Apparatus for..... G. Renner et al
Bread or cake box..... J. Powers
Brick making machinery..... H. Hanni
Brooder..... J. M. Sontag
Broom..... W. H. O'Keefe
Broom, &c. hanker..... J. F. Whitehead
Broom head..... J. H. Webb
Broom head..... H. W. Judvine
Buffing machine..... M. H. Baird
Buggy top, Folding..... J. A. Wilson
Bung..... R. Spahn
Bunsen burner..... C. W. Taylor
Button or stud, Attaching..... C. H. Schopbach
Calendar..... C. C. W. Stelter
Caliper device, Sheet..... T. C. Dexter
Call apparatus, Electric..... C. Shore
Camera panoramic attachment..... H. L. Fisher
Can filling device..... P. Strattner
Can heading machine, Automatic..... A. W. Livingston
Can opener..... G. W. Gombel
Candelabrum..... J. G. Theobald
Cane..... S. A. M. Khan
Car brake..... S. H. Pocock
Car checking device..... A. M. Acklin
Car coupling..... L. N. Singin
Car coupling..... J. M. Clark
Car coupling draw bar draft drugging..... J. M. Waugh
Car draft rigging, Railway..... J. M. Waugh
Car, Dump..... H. C. Williamson et al
Car, Dumping..... J. C. & R. A. Sturgeon
Car emptying mechanism..... J. M. Riddle
Car fender..... J. H. Sartin
Car, Metal freight..... L. T. Canfield
Carbonometer..... F. S. Downes
Carburetor..... O. A. Lane et al
Carbureting apparatus, Air..... P. R. van der Made
Cards, Machine for lacing jacquard..... V. Royle
Cash register..... E. S. Smith et al
Cash register..... F. H. Bickford
Cash register..... 2 pats..... J. P. Cleal

Ceiling..... J. Freckmann
Cement, Strengthened cast..... J. Daime
Chain, Halter..... S. M. Wells, Jr
Chataleina holder..... T. H. Fishel
Crimmey thimble..... C. F. Schroth
Cigarette machine..... C. R. Spencer
Cinematographic apparatus..... F. Alberini et al
Clasp..... F. Crane
Clothes line reel..... D. Krex
Clothes line tightener and adjuster..... D. T. Blevins et al
Clutch, Automatic..... G. S. & J. J. Huff
Clutch, Traction engine friction..... P. Sewenson
Cock for water heaters, Combined gas and water..... W. B. Folger
Coffee hulling machine..... A. H. Hopkins
Coin controlled apparatus, Fraud preventing device for..... O. E. Sorg
Coin holder..... J. Williams
Coin weighing and counting machine..... C. W. Reeves
Coke oven..... R. D. Martin
Collar, Horse..... H. J. Breeze
Commode..... J. B. Frost
Combination wrench..... C. J. Barnes
Commutator brush..... C. G. Curtis
Compound engine, Telescopic..... W. Schneider
Condenser and water heater, Tubular..... C. P. Horton
Conveyer..... A. J. Frith
Cooking utensil..... E. S. Oliver
Cooling and ventilating apparatus..... J. & W. Titus
Cop tube carrier..... S. W. Wardwell
Corset, Apparel..... C. H. Schopbach
Corset, Extensible..... F. C. Smith
Corset shaping machine..... S. Kops
Cotton cleaner..... J. T. W. R. & G. B. Rodgeis
Counter..... H. R. Heal
Cover retaining device for pots or kettles..... C. D. Brown
Crane for handling lumber, &c..... H. Brooke
Crate for bananas, Shipping..... T. J. Lowther
Crushing mill..... T. L. & T. J. Sturtevant
Cultivator..... P. J. Nelson
Currycomb..... S. B. Felty
Curtain fixture..... M. Jolliffe
Curtain fixture..... O. L. Schanbacher
Cutting apparatus..... G. H. Peterson
Cutting mechanism..... F. Herb
Cycle driving mechanism..... J. W. Edbald
Cycle, Motor..... H. H. Peirce
Damper mechanism, Time..... S. S. Colt
Despatch tube..... F. R. Taisey
Detergent and making same..... F. N. Pease et al
Disinfecting compound..... W. Martin
Disinfecting sewer vaults, Apparatus for..... J. H. Louder
Distilling apparatus..... J. J. Roake
Distributing tank..... K. G. Baikhansen
Ditch roller..... S. D. McGuire
Door check..... F. J. Miller
Door stop..... W. V. Bleha
Drawing machine, Railway head or other similar fiber..... A. W. Mathewson
Dress shield..... M. B. Gault
Drier..... G. W. Trammel et al
Drill braces, Attaching device for..... J. F. Steckenreiter
Drill socket..... O. A. Parpart
Drinking fountain for fowls..... W. H. Busch
Dust collector tubes, Support for..... O. E. McMeans
Educational appliance..... L. C. Levy
Educational appliance..... W. A. Proctor
Electric machine regulator, Dynamo..... C. M. Green
Electric meter..... G. H. Meeker
Electric motors or other electric translating devices, Controlling 2 pats..... G. T. Woods
Electric motors or other electrical translating devices, Apparatus for controlling..... G. T. Woods
Electric switches, Independent operating means for..... J. H. Spangler
Electric switch..... E. R. Storm
Electric time switch..... W. J. Carter
Elevator door..... J. Mathews
Embossing and printing machine..... P. V. Avril
Embossing machine..... F. J. Albrecht
Engine..... J. C. Blevney
Engine boiler..... G. E. Hesse
Engine shaft..... J. L. Clayland
Engine speed regulator, Explosive..... A. L. Kull
Engines, Draft generator for threshing machine..... V. Stolz
Envelope, Return..... T. C. West
Expansion joint..... R. E. Vail
Explosive engine..... F. D. Sweet
Extension table..... J. Cornell
Feed roll..... E. Ordning
Feeder, Automatic boiler..... F. Leadbeater
Feeder or elevator, Automatic..... H. L. McCoy
Feeding machine..... F. L. Cross
Fence, Wire..... C. T. Brown
Fiber from stalks, Machine for separating..... S. B. Allison
File..... L. C. McNeal
Filter..... C. S. Parker
Filter..... E. M. Knight
Filter strainer..... W. Wagner
Filter, Water..... W. Wagner
Firearm, Automatic..... R. H. Kjellman et al
Fire extinguisher..... J. H. Britton
Fire extinguisher..... C. F. Brigham
Fireproof window..... L. D. Biersch
Fireproof window, Self closing..... F. D. Swaney
Fish trap..... A. E. Zangenberg
Flash light lamp, Photographic..... J. L. Zweck
Floor and ceiling construction..... J. Schratwieser
Floor construction..... J. W. Rapp
Fly trap..... Z. E. Drake et al
Folding box..... J. J. McCormick
Folding box..... 3 pats..... Z. B. Webb
Follower, Hinged split..... C. A. Batchelder
Foot warmer..... J. T. Cole
Fountain..... F. W. Darlington
Fruit drier..... W. A. Cates
Fruit or flower picker..... T. Drynan
Fuel, Manufacture of artificial..... E. Springborn
Fuel attachment..... W. A. Hesse
Furnace for burning bituminous coal..... 2 pats..... E. M. Hugenobler
Gage..... P. C. Smith
Galvanic battery..... W. Erny
Galvanic battery or pile..... C. J. Reed et al
Game ball..... W. H. Hoyt

Game device..... E. Lasker
Garment supporter..... E. W. Carter
Gas burner..... W. J. Smart
Gas burner pressure regulator, Automatic..... C. A. Haas
Gas burners, Mantle holder for incandescent..... F. Quatram
Gas generator, Acetylene..... J. J. Hendler
Gas generator, Acetylene..... J. H. Ross
Gases, Apparatus for cooling and cleaning blast furnace..... B. H. Thwaite
Gasolene burner..... W. C. Rand
Gate..... W. R. Snyder
Gearing, Frictional..... G. Silvestri
Glass, &c. Decorating..... H. L. von Bonhorst
Glazing bar..... D. J. Jarvis et al
Globe holder..... G. G. Gray
Gluing machine..... G. W. Fassett et al
Gold separating machine..... B. W. Sweet
Grading and ditching machine..... W. H. Morenus
Grafting implement..... D. A. Manuel
Grain binder..... H. B. Sperry
Grain binding machine..... M. Kane
Grain, Drying..... V. Lapp
Grass uprooter..... D. N. Phillips
Grinding machine, Drill..... C. A. Chandler
Gun, Automatic..... A. Vickers
Gun cleaner..... A. W. Bishop
Gun ejector, Breakdown..... E. H. Elder
Guncotton press..... A. Holling
Handle..... E. Seybold et al
Handle bar for cycles, &c..... F. Sadler
Harness safety attachment..... M. A. Dunn
Harrow tooth..... A. H. Schaeffer
Harvester, Corn..... V. Degenhard
Harvesting implement, Celery..... J. G. Smith
Hay elevator..... J. J. Ney
Heating apparatus..... J. A. Dezell
Heel cushion, Shoe..... L. Schwarz
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Hinge..... J. G. Smith
Hitching or unhitching device, Horse..... S. McIntyre
Hoist..... D. E. Rowland
Hoof pad..... A. C. Tappe
Hook and eye..... A. K. Phillips
Hook and eye, Safety..... T. Pederson
Hooper for refining engines..... C. Wurster
Hose member..... W. C. Anderson
Hose terminal..... H. E. McKeckney
Hot water heater..... F. Robbin
Hubs, Machine for forming spoke holes in..... E. Einfield
Hydraulic motor or pump and reversing valve therefor..... W. O. Worth
Hydrocarbon engine..... A. D. Richardson
Hydrogen sulfid, Making..... H. H. Wing
Ice cream freezer..... J. A. Singo
Ice pick..... W. G. Browne
Ignition arch..... J. P. Sneddon
Igniting plug..... I. H. Davis et al
Illuminating and heating burner, Combination..... V. K. Coffill
Incandescent lighting device..... M. D. Hooker et al
Ink, Copying..... E. P. Lawton
Inkstand..... L. I. Perry
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Key holder..... F. E. Brown
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Lamp glowers, Making electric..... M. W. Hanks
Lamp socket..... J. C. Tourmier
Lath for plastering foundations..... J. John
Lathe attachment for relieving the teeth of cutters..... F. W. Parker
Laundry bag..... G. H. Grant
Lawn sprinkler..... H. Papenfus
Lead from lead ores, Obtaining metallic..... A. Gernot
Leaf turner..... W. J. Brashears
Leather stretching device..... J. Caldwell
Linotype machine..... P. T. Dodge
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Locomotive ash pan..... H. L. Browder
Locomotive springs, Spring hanger for underhung..... H. A. Gilis
Loom shedding mechanism..... J. W. Platt
Loom shedding motion..... W. C. Asimos
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Looms, Electromechanical controlling mechanism for..... J. C. Edwards
Luggage rack..... H. Clark
Magnesium sulfite, Making..... H. H. Wing
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Mat..... A. Baumgarten
Match making machine..... J. Dela Mar
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Memorandum clip board..... R. B. Dickey
Merchandise, System for distributing..... R. O. Wickes
Metal and the manufacture thereof, Covered strip of soft..... I. W. Hiesinger
Metal bars, Posette for forming crossed joints for..... M. Mendel
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Molding machine, Continuous..... B. Fletcher
Mowing machines, Means for adjusting finger bars of..... W. D. Myers
Music cabinet, Sheet..... O. H. Stewart
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Nasal distender..... W. Moores
Newspaper holder..... J. Conzett
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Nut lock..... D. T. Wallace
Oil engine, Internal combustion..... H. F. Wallman
Oils, Apparatus for the vaporization, combustion, and utilization of hydrocarbon..... T. Tomblinson
Organ..... L. D. Hickman
Pail burner attachment, Dinner..... S. H. Gartrell
Paper box, Folding..... M. Herre
Paper, Centrifugal sizing apparatus to sizing wood pulp or similar materials for the manufacture of..... H. Schiller
Paper corrugating apparatus..... J. T. Ferris
Paper drying machine..... W. M. Barber
Paper making machine..... C. H. Atkins
Paper marker..... P. H. Grabler
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for tearing up..... C. Wurster
Phonograph or graphophone horn..... J. W. Henderson
Photographs, pictures, &c. Stand or frame..... W. Guttenberg
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Pile fabric, Woven..... A. F. McCollum
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Piston lubricator, Steam engine..... J. C. Blevney
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Plow..... W. R. Oyer
Pneumatic despatch tube carrier..... A. W. Pearsall
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Power transmission device..... W. L. Judson
Power transmission mechanism, Variable speed..... W. L. Judson
Power transmitting device..... I. H. Davis
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Pressure regulator, Automatic..... A. S. Comstock
Printing carpets, mats, &c. Apparatus for..... A. F. Lundeborg
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Pulping machine..... C. Wurster
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Rail tie and fastener, Steel..... J. S. McAuley
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Railway, Electric..... G. Davis
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Railway, Single track..... H. H. Teunis
Railway switch..... E. B. Green
Railway system, Electric..... H. P. Wellman
Railway T rails, Grooved rail appliance for street..... H. C. Phelps
Railway tie..... J. P. Bickerstaff
Railway tie, Steel..... I. Dinger
Railway track and car truck..... G. Meader
Railway track jack..... H. Hale et al
Railway vehicle life guard..... G. Kirby
Range boiler..... A. C. Badger
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Razor, Safety..... A. L. Silberstein
Register top plate..... D. G. Clark
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Request and mailing sheet, Combined..... D. S. Taylor
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Roasting pan..... J. Herbs
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Rock drill..... A. M. Ballou
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Roofing material..... F. S. Miller
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Sash fastener..... J. A. Kemp
Saw..... L. R. Sosha
Saw, Double cutting band..... E. E. Thomas
Saw jointer and gage, Combined..... D. W. Solomon
Sawmills, Haul up chain unloader for..... E. E. Thomas
Sawmills, Reciprocating lumber mover for..... E. E. Thomas
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Sewing machine shuttle..... V. Royle
Sewing machine stripper plate..... R. G. Woodward
Sewing machine tucking guide..... R. C. Johnson
Sewing machines, Finger tip attachment for glove..... L. A. Van Praag
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Show tray..... T. S. Coffin
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Skate..... O. W. Everett
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Smoke consuming furnace..... 2 pats..... G. S. & J. J. Huff
Smut machine..... A. Coleman
Snaphook, Combined bridle and halter..... J. Candish
Snow melter for railway switches..... G. Kovacs
Soda fountain apparatus syrup drawing can therefor..... J. C. Johnson
Sparkling coil..... M. H. Moffett
Speaking tube terminal..... I. O. Brown
Spinning or twisting frame..... L. W. Campbell
Spinning or twisting machine..... L. W. Campbell
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Stamp, Time..... C. S. Moseley
Steam boiler..... B. F. Jackson
Steam plant drainage system..... J. Angell
Steam separator..... D. E. Austin
Steering gear..... P. H. White
Stitch separating machine..... J. B. Hadaway
Stocker, Mechanical..... G. S. & J. J. Huff
Stove..... G. M. Cocke
Street sweeper..... D. D. Hitchings
Striking bag..... W. H. Price
Surgeons' use, Sterilizer for..... C. E. Norton
Swimmer's appliance..... H. Pratt
Switch operating device..... E. L. Pence
Switch operating mechanism, Electric..... J. H. Spangler et al
Tag, Price..... S. Dancyger

Tape holder..... R. Sims
 Telephone attachment..... H. I. Hanxhuist
 Telephone lines. Service meter for..... F. R. McBerty
 Tenon cutting machine..... D. Lynn
 Thill support..... J. H. Kessler
 Thread cutting attachment for spools..... J. F. Cordes
 Threshing machine..... J. A. Beam
 Time recorder..... S. Bower
 Tire protector. Pneumatic..... C. G. Dinsmore
 Tire. Rubber vehicle..... R. B. Price
 Tire shrinking machine. Cold..... S. N. House
 Tire. Vehicle..... W. M. Peck
 Tire. Vehicle wheel..... J. Ludwig
 Tires. Composition for repairing bicycle..... O. J. Campbell et al
 Tires. Device for automatically inflating pneumatic..... G. O. Morris
 Tobacco pipe cleaner..... J. F. Forth
 Toilet cream..... J. C. Fleming
 Tongs..... W. Hopkie
 Tool box..... D. E. Frederiksen
 Toy..... C. Gordon
 Toy. Coin operated mechanical..... F. Partsch
 Toy savings bank..... B. T. Wolf
 Tracing and cutting implement..... G. R. Vander Wee
 Trap..... R. G. McAuley
 Traveler..... A. Lonergan
 Treese. Apparatus for transplanting and transporting..... J. M. Ralston
 Trolley arms. Sleet cleaning device for..... M. M. Nash
 Trolley. Electric crane..... M. A. Beck
 Trolley harp..... F. P. Crockett et al
 Trolley wire ice cutter..... A. Ambuhl
 Trowel..... W. E. Coyn
 Truck..... J. A. Martin
 Truck. Car..... S. A. Crone
 Trunk. Cleansing..... 3 pats. F. H. L. James
 Trunk or bale rope attachment..... L. S. Ford
 Truss. Hernial..... L. A. Smith
 Tube boring out apparatus..... J. Roan
 Tubular boiler..... W. B. McCord
 Type casting and composing apparatus..... H. J. S. Gilbert-Stringer
 Type writer..... C. E. Peterson
 Type writer pad..... R. E. Revalk
 Type writing machine. 2 pats..... R. J. Fisher
 Valve. Cut off..... J. La Burt
 Valve mechanism. Air brake..... E. G. Shortt
 Valve. Renewable seat..... G. W. Walters
 Valves for pumps, &c. Arrangement of..... F. W. Rogler
 Vegetable cutter..... H. Boos
 Vehicle controlling mechanism. Motor..... J. F. McNutt
 Vehicle. Motor..... W. J. Burt
 Vehicle. Motor..... A. B. Fowler
 Vehicle wheel..... A. D. Smith
 Vending machine. Coin controlled liquid..... O. E. Sorg
 Vending machine. Coin operated..... C. L. Hurd
 Vessel closure. Metallic..... R. E. King
 Voting machine..... A. J. Rota
 Wagon bolster stake..... A. B. Eisaman
 Wagon brake. Automatic..... T. F. Black
 Wagon lock..... C. S. Dobbins
 Waist. Child's..... F. A. Platz
 Warp stop motion apparatus..... J. A. Lamb
 Washing machine..... G. B. Dowsell
 Washing machine..... O. L. Johnson
 Washstand fixture..... J. Barrett
 Watchcase pendant..... C. W. Butts
 Watch. Stop..... S. Goldfaden
 Water fountain and cooler. Sanitary..... S. S. Shears
 Waterproofing fabrics..... J. Merzies
 Wax from bituminous brown coal. Manufacturing mineral..... E. von Boyen
 Weather board marker..... A. C. Maeder
 Weather strip..... G. W. Golden
 Weather strip..... C. W. Gautschi
 Weighing and recording apparatus..... W. Greene et al
 Weighing machine. Automatic..... A. Arthur
 Well tubing protector. Oil..... G. F. Tait
 Wick. Lamp..... E. S. Macfie
 Wind power apparatus for converting, storing, and utilizing..... P. F. Thede
 Winding composite cops. Machine for..... S. W. Wardwell
 Window platform..... H. S. Howard
 Window screen. Adjustable metallic..... T. J. Perrin
 Wire crossings. Hand machine for casting balls upon..... J. Harris
 Wire grip..... W. C. Jones
 Work conveying and presenting mechanism..... R. B. Fuller
 Wrench..... F. P. Bates
 Wrench..... F. W. Dent

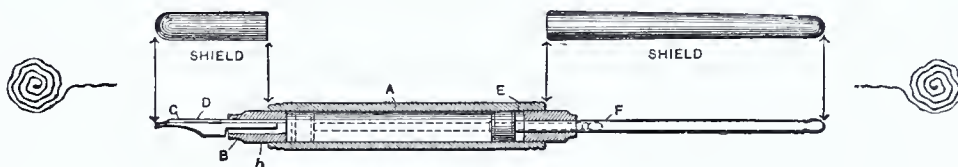
DESIGNS.
 Advertising puzzle sheet..... C. E. Jaques
 Belt..... L. Sanders
 Belt..... B. Wilentshik
 Bottle..... K. Kiefer
 Box opener..... W. Hathaway
 Burners. Bowl for hydrocarbon..... W. R. Jeavons
 Corset..... J. M. Van Orden
 Drinking vessel..... G. Forgach
 Fan casing. 2 designs..... A. L. Streeter
 Garment supporter..... F. G. Dietz
 Hose supporter..... A. Hunter
 Knife. Butter..... W. Hathaway
 Life preserver body..... H. A. Ayvad
 Pail cover..... J. S. Roblin
 Parer frame. Fruit..... F. W. Belko
 Plowshare lay..... W. Gibson, Jr
 Shoe sole..... J. S. Busky
 Spectacles or eyeglasses. Nosepiece for..... I. Fox
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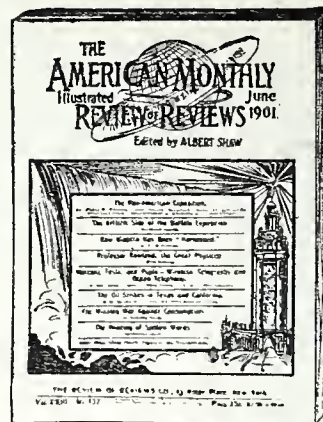


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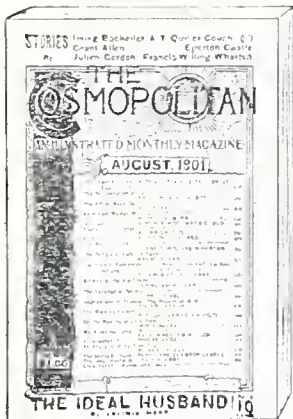
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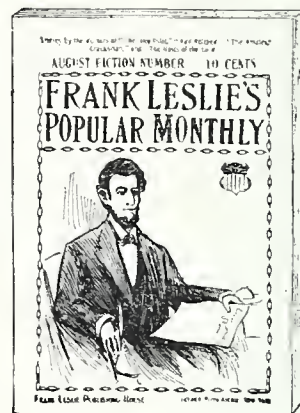
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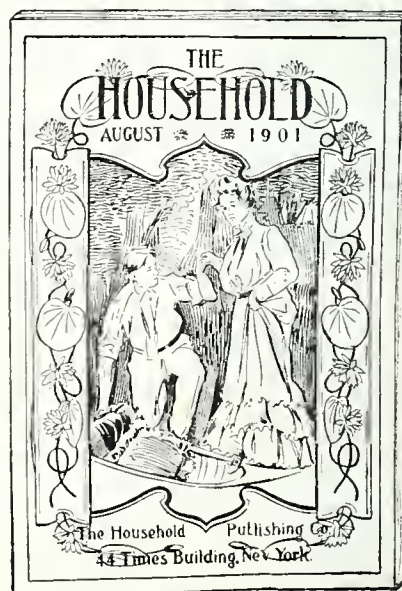
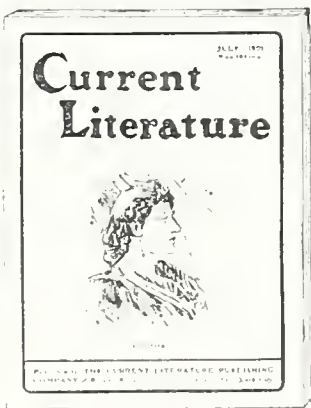
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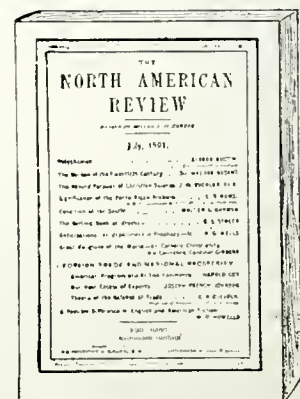
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U. S. PATENT OFFICE DIVISION XXI.

TEXTILES.

COMPREHENDING BRAKES AND GINS, SPINNING, WEAVING, KNITTING
AND NETTING.

It is not conclusively known when the human race first discovered that certain vegetable products were flexible in one direction and capable of resisting great strains in another, but the cultivation of fibrous plants is certainly of the greatest antiquity. The Bible contains many references to textile plants, and the important class of animal fibers is no less of great antiquity.

Before the primitive races could make successful use of the abundant provisions in nature in the matter of vegetable fibers, they were enforced to provide at least rudimentary machinery for reducing the stalk or bark to a product which they could manipulate. It is not difficult to believe that the predominance of cotton fiber in the arts at this day is due to the difficulties met by our forefathers in the use of fibers less well prepared by nature for the arts of man, for cotton occurs in nature practically in a perfect condition for spinning into thread, excepting that it grows upon a plant and must be picked, and contains a seed which must be removed. All Americans know how much fame Eli Whitney has for having

taught us how to commercially remove this seed. Of course the natives of India and other warm countries where cotton is indigenous, have long possessed less efficient means for performing this operation, but Whitney's invention is the pioneer of the gins, which other American inventors have reduced to a state of great perfection, and which machines annually and in a short time reduce the raw crops of our agriculturalists to a marketable and enormously valuable staple. These machines have but two types, those which seize and

tear the fiber from the seed by means of a revolving saw, the seed being caught between the bars of a grid through which they cannot pass; and the roller gin, which catches the fiber more gently between revolving rollers and pulls it away from the seed. It is interesting to note that the first gin is essentially Whitney's and has never departed from the ideas contained in his original patent in any great degree, while the second type—that which performs more perfect work, but more slowly—is the direct descendant of the hand rollers used to this day by the Hindoo peasant.

Fibers of hemp, flax and other plants containing fiber in their stalks are more difficult to reduce to a state which permits spinning. The flail remained through all the ages of history the only instrument for accomplishing this purpose until comparatively recent times, when mechanically operated brakes were resorted to, to break, bend and crush the stalks so as to prepare them for the separation of the fiber proper from the broken woody parts. Such machines are of great

number in the patented art in the Patent Office, and of widely varied types. It needs only to be suggested that the structures which must be dealt with vary from the fleshy, thick leaves of plants of the Agave family to the hard, woody stalk of ramie, or the extremely tough husk of the cocoanut, to indicate what a great variety of mechanisms has been produced to meet these different needs. Even when the fibers have been separated from their woody or gummy surroundings, they remain to be straightened and laid parallel with each other in some efficient way than by drawing a bundle of fiber through a row of closely set pins—the ancient operation of hackling or hatchelling. The



DIVISION XXI OF THE U. S. PATENT OFFICE.

longer vegetable fibers once obtained, are not in such tangled condition as the fibers of cotton and wool, which must be laid parallel with each other and made into a comparatively continuous and even fleece or sliver. This is done in two ways, by carding, and by combing.

The carding operation as performed by our ancestors was a slow and laborious brushing between two stiff brushes or combs of a small mass of fiber. The revolving carding machine due to Paul, Hargreaves and Arkwright during the

latter half of the eighteenth century really made possible the extensive textile industries of modern times. These machines have of course been improved and perfected to keep step with the march of the other arts, until today the carding machine, while operating in substantially the same manner as the earliest machine, exhibits great perfection of structure and efficiency in output.

The combing machine is more modern in its origin and is intended to perform the same operation as carding, in a different way, quite closely analogous to the treatment of long fibers in hackling machines. Many types of combing machines have appeared and all will have their advocates. Here, again, recent invention has been in the slow perfection of the machine, rather than in the alteration of its elements.

No mention is here made of the great variety of machines used for picking open, beating against screens, dusting and cleaning the masses of fiber, although such machines are commercially necessary prior to carding and combing fibers.

Cloth as it comes from the loom or from the knitting machine is in many cases far from the perfect fabric. The surface of the cloth may have to be completely altered in an innumerable variety of ways, or the body of the cloth in some way changed or perfected. These operations are comprised under the head of Cloth Finishing, and form an active and interesting subclass in the Patent Office. The operation of fulling cloth made of fibers capable of felting together, such as wool, is the pounding and hammering of the fabric, while if wet with hot water, the result being the thickening of the fabric and its reduction in length and width, the individual threads becoming more or less indistinct in the mass made up by their felting with each other. Cloth may be singed to remove the nap of fine fibers projecting from the surface; it may be brushed with revolving brushes or rolls of emery cloth to raise a fine nap; it may be dampened with steam or water and dried; in most cases it must be stretched to remove wrinkles and it must be freed from knots and imperfections. Each of these operations, as well as some others not mentioned, has its own appropriate machinery, and in many cases there are many types of machinery for performing the same operation.

SPINNING.

This is the next step in the treatment of fiber after it leaves the carding engine, and is in itself a very simple process, that of twisting the fibers into the form of yarn or thread. The slubbing, or product of the carding engine, is given successively a stretch or draw, then a twist, until the yarn is of the diameter, or weight per given length, desired. To make the yarn into the thread as known to the trade, two or more yarns are "doubled" or twisted together with a hard twist in a direction opposite to the twist of the individual yarns. This results in what is known as two, three or four-ply thread, depending, of

course, upon the number of strands doubled.

Spinning the yarn is accomplished by the use of one or more of three types of machines—the fly frame, the ring frame, or the mule. The fly frame is, with the exception of the old hand spinning wheel, the oldest of these types. A U-shaped frame, called a flier or throstle, is mounted concentric with the spindle, and the flier and spindle are given different speeds of rotation relatively to each other. The yarn is led from any suitable delivering means through a hole in the arm of the flier and is then attached to the spindle. The rotation of the flier gives a twist to the yarn, and the difference in speed between the flier and spindle causes the yarn to be wound on the spindle. Either the spindle or the flier is given a longitudinal motion with respect to the other, and as a result the yarn is laid up on the spindle in courses in the form of a cop. The sound that the machine makes in running resembles that made by the thrush, and hence it derives its name, throstle.

The ring frame while perhaps owing its origin or conception to English inventors, was successfully developed and made practical in the United States. The yarn is first laid up on the spindle in the same way that it is in a fly frame. The flier is replaced by a ring around which a very light U-shaped traveler is dragged by the thread upon the rotation of the spindle. The traveler does not move around the ring as fast as the spindle rotates, and consequently produces a winding up of the yarn on the spindle.

The mule is the most complicated of spinning machines, as can readily be appreciated when it is made apparent that the machine performs automatically every step which is done by hand on the old and well-known spinning wheel.

The class of Cordage contains those machines which treat the yarn or thread after it leaves the spinning frame. It contains machines for sizing, gassing (burning off the lint from the yarn), polishing the yarn, and also machines for making the yarn or thread up into ropes or coils. Under the class of cordage are found the machines which also make twine from straw and paper, and braiding machines.

The winding up of the yarn or thread into a ball or on to a spool would seem to be a very simple operation, but when the immense output of thread is considered, the winding up of the thread with rapidity and accuracy becomes very important. Many complicated machines have been devised for doing this. Either a large number of spools are wound at the same time, or a spool is taken automatically from the hopper, placed on a spindle, wound to contain a given length, the thread is cut, attached to the spool, the spool ejected, and a new spool placed on the spindle, and a machine accomplishing all these various steps automatically must be necessarily of many parts and exceedingly complicated.

Silk is also a class found in this

division, and in many respects the machinery employed in treating the silk is very similar to that employed in twisting or spinning other fibres. However, the treatment of silk does vary in some respects, since the silk is taken from the cocoon directly and spun. The cocoons are usually placed in a bath of water upon which they float, and the end of the silk in the cocoon having been found, that end is carried upward through a guide and united with other threads passed through a twisting mechanism, and wound on spools or reels. The cocoons on the water are free to turn about as the silk unwinds from them. The silk industry in the United States, although comparatively small, is increasing in importance and in the amount of output. The field of search on the patentability of inventions for the treatment of silk is, however, large, especially in the Italian, Sardinian and French art, where this industry is old and well established.

WEAVING.

The art of weaving is of indeterminate antiquity and contemporaneous with the earliest records of mankind. There are frequent references in the Old Testament to "fine linen," in which fabric, it is related in the book of Genesis, Joseph was arrayed by Pharaoh. In a moment of anguish Job lamented that his days were "swifter than a weaver's shuttle."

Throughout the ages the fundamental operations performed in weaving have remained unchanged. The common origin of the art is shown by the fact that in every race on the globe the explorers have discovered a knowledge of weaving. In 1733 the fly shuttle motion was devised, it being used to propel the shuttle through the shed in the warps in place of the former practice of passing it through by hand. In 1785 a power loom was constructed, and in 1801 the Jacquard was invented. It was not until within the last ten years that any radical change was made in looms, but recently a continuous weft loom has been perfected which represents the highest development of the power loom for weaving plain fabrics. This type of loom automatically replenishes its supply of weft, and one weaver is enabled to attend sixteen or more looms, instead of four, as formerly. Its introduction has reduced the labor cost of production of such fabrics about one-half.

There are approximately 5,100 United States patents on looms and accessories.

KNITTING AND NETTING.

The class of Knitting and Netting covers both knitted and netted fabrics and the machines for producing them. These fabrics range from fishing nets, stockings and underclothing to the fine machine-made laces which have done so much to render it easy for the average woman to appear in tasteful and beautiful clothes.

Knitted fabrics are generically those in which the threads are formed into loops intermeshing with other loops, the characteristic fabrics resulting therefrom being elastic in all directions. It is this characteristic which has made the knitted fabrics

necessary in all situations requiring a fabric which will readily conform to changing contours. Machines of this class are notably complex, those for knitting a simple stocking being scarcely less so than the larger, if no more elaborately organized, machines which produce nets and laces. This will be readily seen when it is understood that in these machines there must be an operative needle for each row of meshes of the fabric, and that the motions which these needles must perform with rigid accuracy are of themselves complex. Briefly, a knitting machine must contain means to advance and retract the needles, to lay a thread within their barbed ends and to pull a short loop of the thread through a previously formed loop on the shank of each needle. This operation is usually done by causing a wave of motion presenting successively each of the phases of this motion at each needle to pass along the operative needles of the machine, the wave being created by properly arranged cams contacting with some part of the needle.

Of course this simply means that if we will consider the needles as arranged in a circle with means to move them properly and to supply thread, such a machine will produce a tubular fabric; but the modern requirements for manufacture call not only for tubular fabrics; but for the completely and automatically knitted stocking or the perfectly shaped part of a garment. The automatic machinery for producing these results has been the subject of a great deal of invention, and improved machinery of this sort is now perhaps more actively sought than ever before. The many notable inventors who have labored in this art have succeeded in reducing the expense of the average man's wardrobe to a very considerable degree, and have at the same time provided a mass of patents illustrating the ingenuity and skill of a class of mechanics perhaps unrivaled in their ability to deal with complex structures.

The industrial importance of this branch of textile manufacture is obvious when we consider the absolute dependence of the present day man and woman on knitted fabrics for a very large portion of the clothing commonly worn. This manufacture is becoming of increasing importance in the United States, since the automatic machine has now reached a state in which it may be said to have fairly compensated us for the higher wage rate demanded by our skilled operatives.

Mr. Irving U. Townsend, the Examiner in charge of this division was born in Fulton, N. Y., and is a graduate of Johns Hopkins University. He is also a graduate in law from the Columbian University of Washington. He was appointed as an Assistant Examiner in the present division on August 18, 1886, and afterwards was made a Principal Examiner, being placed in charge of Division II on September 25, 1893. In July 1899 he was transferred to his present position.

Mr. William F. Woolard, First Assistant Examiner, was appointed fourth



MR. IRVING U. TOWNSEND.

assistant and assigned to Division XXI, July 1, 1891, since which date he has been employed continuously in that Division. He was educated in collegiate schools in Illinois, and in both the Scientific and Law Schools of Columbian University, of Washington. Mr. Woolard examines the Class of Weaving.

Mr. Arthur H. Giles, Second Assistant Examiner, was appointed in the Patent Office from the 27th district of New York, in July 1889. He was educated at Syracuse and Johns Hopkins Universities, and later studied law and graduated from the Columbian Law School of this city in 1893. He examines applications in the classes of Weaving and Cordage.

Mr. L. D. Underwood, 2nd Assistant Examiner, a graduate of Columbian University, was appointed to the Examining Corps in 1897, and is now in charge of Carding, Brakes and Gins, Cloth-Finishing, Felt and Fur.

Mr. Alston B Moulton, 3rd Assistant Examiner, appointed from Massachusetts to the Examining Corps in December 1895; graduate of Worcester Polytechnic Institute in Mechanical Engineering and of Columbian University in Law. Examines applications relating to Spinning, Cordage and Silk.

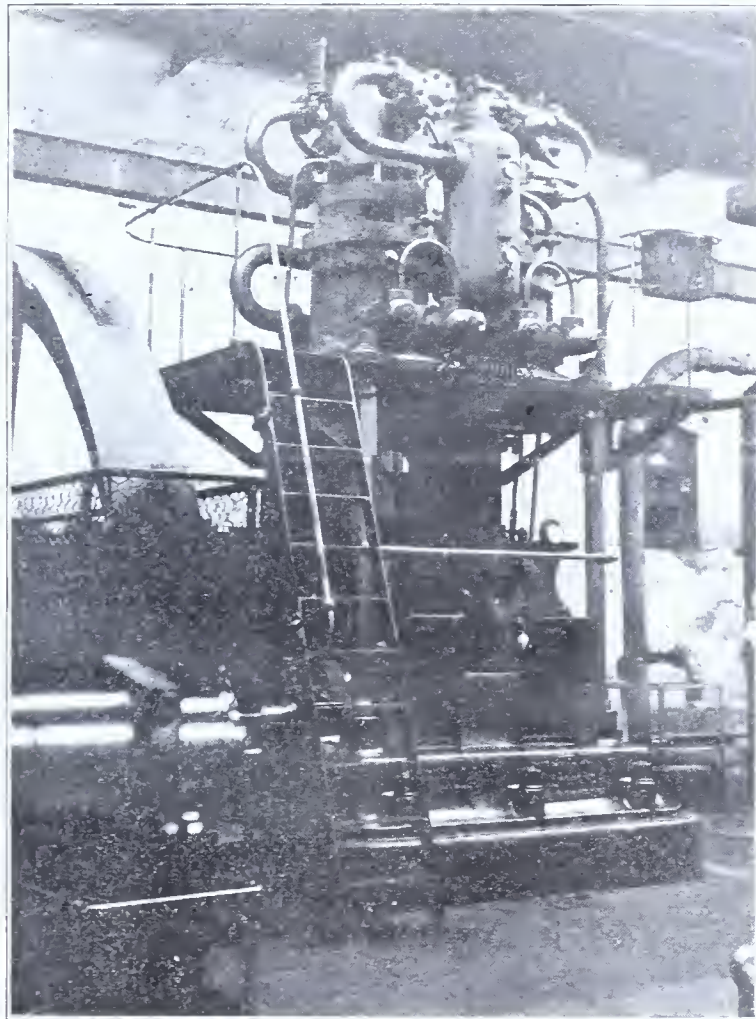
Mr. Robert C. Child, Third Assistant Examiner, was appointed to the Office by transfer from the Astrophysical Observatory of the Smithsonian Institution in 1896, and to the corps of examiners as the result of a subsequent examination. He received his academical education at the College of William and Mary, and his technical training at the Massachusetts Institute of Technology. He has been assigned successively to the examination of the classes of Advertising, etc., in Division XXXII; Sewing Machines, in Division XXIV; Carding, Brakes and Gins, etc., and now examines Knitting and Netting in Division XXI.

Manufacturers of Garbage and Ash Cans.

We have received a letter from the American League for Civic Improvement, whose headquarters are at Springfield, Ohio, stating that inquiries have been made for the names of manufacturers of baskets and cans to be used for gathering the debris of villages and city streets. The league is desirous of enlarging its reference lists of manufacturers to whom such inquiries may be referred. Manufacturers who are engaged in making such articles should correspond with the league. Business may be secured in this way.

COMPRESSED AIR FOR RAILWAYS.

THE power of air in the force of the wind was probably the earliest of the forces of nature captured by mankind and utilized in moving the first sail on the sea, and by its progressive use, has contributed its vast power to extend the civilizing influence of commerce to every part of the world. Nor is its power confined to the gentle winds that waft the sails or turn the windmills; its terrors in the storm and the tornado are in constant evidence. In our every day uses, the power of air is what we make it. We compress it, and bottle it up under vast pressures, in which its power is a potential element ready for work at our bidding.



AIR COMPRESSOR.

Compressed air for driving vehicles seems to have had its birth with the beginning of the nineteenth century in a patent to Medhurst, in England, August 2, 1800, for means for propelling carriages by compressed air from a reservoir. Compressed air for tramway cars appears to have received an impulse in Wright's English patent, April, 1828. He proposed the use of iron cylinders beneath the cars, with an additional cylinder for heating the air by a small furnace, to increase its expansive force before entering the working cylinder, and to mingle steam, generated by the same furnace, with the hot air.

Compressed air for street railways was continually agitated by newspapers and promoters during the middle of the nineteenth century. But little practical progress was made, much of the difficulties and obstruc-

tions being due probably to the distrust of the moneyed interests of schemes that had no practical and reliable tests and trials.

The introduction of compressed air hauling locomotives in the St. Gothard tunnel was a successful turn in favor of compressed air for railway work, and seemed to stimulate efforts in that direction, for it was soon followed by the Mekarski and Beaumont compressed-air railway systems in Europe, with increased air pressure and better appliances for economical compression and motor use.

It is now thirty years since compressed air for street-railway propulsion began to take form in plans for putting this system into practical operation. Although high air pressures had then and previously been produced in an experimental way, the high storage pressures of the present time were then scarcely dreamed of for practical work. The precise limit of the compressibility of air at ordinary temperatures is as yet an un-

covers almost twelve miles and there are under construction lines which will extend four miles more. The average price per single track is about



TRAMWAY CAR.

\$12,000 per mile. The Nantes system comprises fifty-four tram cars, propelled by means of compressed air. In the cylinders under the cars, built in 1897, the pressure of air is 60 kilograms to the square centimeter. These cars cost \$4,535. each. The operating expenses of the line per mile is eight cents.

The weight of the cars equipped for service is about 10 tons each. One of the cars in actual operation is shown in the small picture. The motors rest upon two axles coupled together at a distance of nearly six feet. The motor cylinders are placed behind, on the outside of the girders, and have a diameter of 6 inches and a course of 9 inches. The distribution is made by means of a groove. There are 9 compressed-air reservoirs and these are charged with air at a pressure of 60 kilograms to the square centimeter, or 132 pounds to 0.155 square inch. They rest transversely under the car. These reservoirs are divided into two groups of unequal volume, and the reservoirs in each group are connected with each other by tubes. The first group, called "batterie," is composed of seven reservoirs, which are used when making ordinary speed. The other two, called "reserve," are used for hill climbing or extraordinary grades. These reservoirs are unequal in diameter and length, in order to utilize as much as possible the available space under the cars. The air coming from these reservoirs passes into an upright cylinder, or reservoir, filled with water heated to a temperature of 356° Fahrenheit. The air enters at the bottom, passes through the hot water to the top of the reservoir, becoming thoroughly heated, and enters the motor cylinders by means of a regulator operated by the machinist, who stands on the front platform of the car.

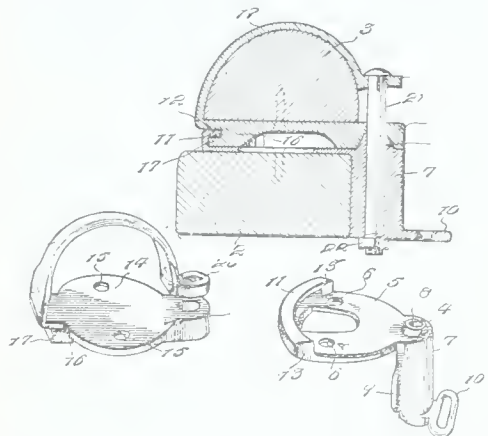
The Mekarski system in use at Nantes differs materially from the Judson system, which was originally constituted of a revolving drum under the track, driven in sections by compressed-air motors, with air compressed in a central station and distributed to the motors through an underground pipe system. According to the Mekarski system the car carries the compressed air stored in the reservoirs, the number of which can be increased, depending wholly on the size of the car and the conditions of service. As many as 16 air reservoirs have been used. The reservoirs are supplied with compressed air at a central station, and in the large photograph appears a representation of the air compressor which is in use at Nantes, France, for storing compressed air in the reservoirs of the street cars. The Mekarski system, with what are known as the Hendrie improvements, is now in use in Chicago, Illinois, New York city, and Rome, N. Y.

CLEVER NEW PATENTS.

Draft Connection.—Damper.—Case for Maps, etc.—Display Cabinet.—Lid Fastener.—Cooler.

Draft Connection.

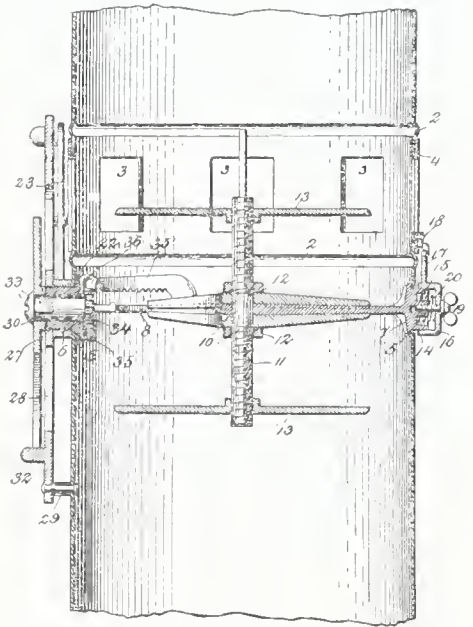
In order to avoid the necessity of forming openings through whiffletrees which greatly weaken the same, Mr. Addison T. Wentworth, a well-known inventor of Bedford, Iowa, has devised a simple and strong connection which has many advantages over the ordinary construction. He provides a bracket 5 which is secured on the upper side of a doubletree and has a tubular support 7, which is arranged at one side and through which is passed the pivot bolt 21. A



clip surrounds the whiffletree 3, and its terminals are secured by the pivot bolt has shown. At the front side the clip is provided with an outstanding flange 17 which engages in a socket 11 made for the purpose at one end of the bracket. By this construction the strain is applied to the pivot bolt, and in turn to the side edge of the whiffletree, and a very superior pivoted connection is provided.

Damper.

An ingenious damper has just been patented by Mr. John W. Anderson, of Lancaster, Pa., his idea being to provide a device of this character that can be easily regulated and will indicate the size of the draft opening therethrough. The accompanying illustration is a sectional view through the damper as applied to the stove pipe. It comprises a frame secured



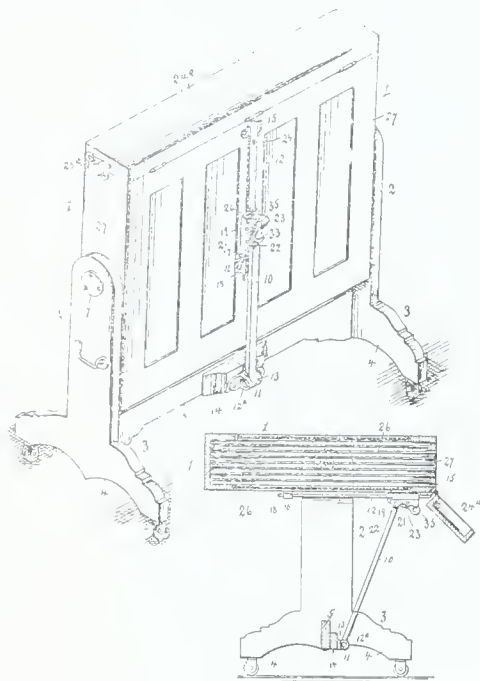
within the pipe and having openings therethrough which are arranged to be closed by a suitable valve rotatably mounted thereon, baffle plates 13 being located on opposite sides of the damper. The valve is provided with a rack arm 35 which engages a pinion

34, secured to the inner end of a stub shaft journaled in the pipe. To the outer end of this stub shaft is fastened a pointer that operates over a dial plate shown in section at the left hand side of the illustration. It will thus be seen that by rotating this pointer, the valve will be operated, and the position of said pointer upon the dial plate will indicate the amount of opening left in the damper. Mr. Anderson has obtained a number of patents in this class, and all of his inventions show his skill as an inventor.

Case For Maps, etc.

For years surveyors, map makers, and public officers having charge of plats, maps and the like, have been seeking for something in which they can store these unwieldy articles, so that they will be protected from injury and yet can be readily examined when desired. To such persons, the invention of an ingenious resident of New Mexico, Mr. Charles E. McClintock, residing at Albuquerque, will prove interesting and well worth examining into.

As will be seen by referring to the accompanying views, a frame is provided having upstanding standards 2, between which is pivotally hung the receptacle 3. This receptacle can be

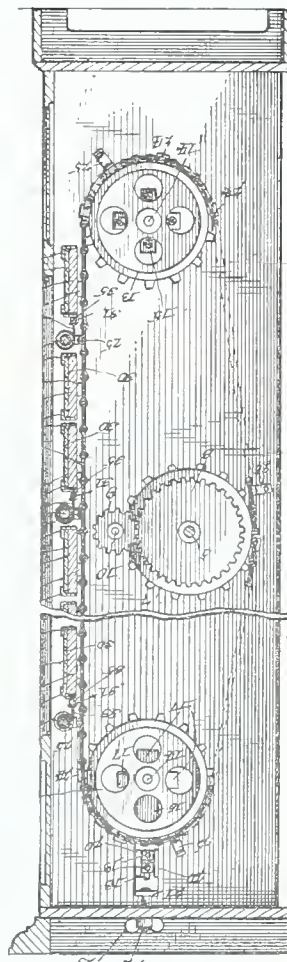


swung to a vertical or horizontal position as shown, and has at one end a hinged cover 24a. It is held in any desired position by a brace 10 pivoted to the bottom of the frame and having a sliding connection with a bar 12 upon the receptacle, said connection being provided with a suitable lock. On the opposite interior faces of the end walls are spaced ribs which form ways or guides, in which separate boards are slidably mounted. To these boards are secured maps or plats.

When the device is not in use, the receptacle is placed in a vertical position as shown in the perspective view, but when it is desired to examine the drawings or maps, said receptacle is swung to a horizontal position as shown in the sectional view, and the cover is opened. Any of the boards may then be withdrawn, and the cover will form a support upon which said board can be rested or placed while the drawing or map carried thereby is being examined.

Display Cabinet.

Many and varied have been the advertising schemes devised for attracting the attention of the public, but none have shown more original thought than the display cabinet conceived and patented by George W. Barnett, of Keokuk, Iowa. The object of the same is to provide a device which is especially designed for conveniently exposing advertising matter and general information per-

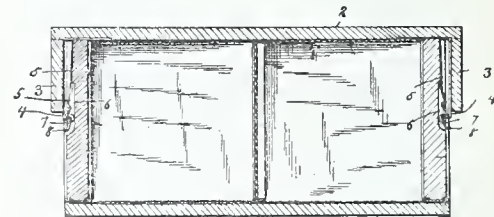


taining to certain localities or places of such a nature that the user can readily ascertain either the names and addresses of certain classes of merchants or tradesmen, as well as descriptive matter or explanations concerning states, counties and towns, and thereby serve as a directory embodying more complete information than is possible in the ordinary sources of instruction.

As will be seen by reference to the accompanying cut, which is a sectional view, he provides a casing having a front opening, and in this casing mounts an upper and a lower shaft 14, said shafts carrying sprocket wheels over which run endless chains. An intermediate sprocket wheel is journaled upon a shaft 5 and engages this chain, said intermediate sprocket wheel being driven by a pinion 9 attached to a shaft 10, that is provided with an exterior operating handle (not shown). Upon the endless chain are arranged a number of spring rollers constructed similar to an ordinary curtain roller, and wrapped upon these rollers are sheets upon which information of different character is printed. To the ends of these sheets are secured plates, that have suitable advertising matter which may be a digest of what appears upon the rolled sheet. Therefore, if a person wishes to obtain any information, he has only to find the proper plate, unroll the sheet, and will thus have everything before him.

Lid Fastener.

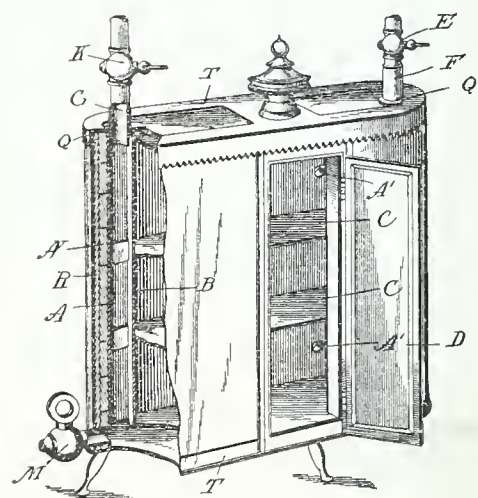
A secure fastener for covers of shipping-crates has recently been invented and patented by Mr. Joseph C. Gentry, of Americus, Mo. The lid or cover 2 of the crate has downwardly extending flanges 3, within



which the body of the crate is received, and to the inner sides of the flanges are secured depending hooks 4 made of spring metal and fastened at their upper ends in any desirable manner. Located in grooves in the ends of the body are toothed spring bars 5, these bars being corrugated so as to provide a series of teeth or ratchets to interlock with the depending hooks. By providing a number of teeth, the lid may be held in different positions, and by locating them within the recesses or grooves, they are protected against displacement or injury. At the same time, sufficient room is provided to enable the parts to be moved inwardly so as to disengage the cover when it is desired.

Cooler.

Mr. Casper Zimmerman, a resident of Fall Creek, Wisconsin, has come to the front again and invented and patented a new refrigerator that will obviate the necessity of the ice man, and dispense with his bill. This inventor employs running water as the cooling agent, and therefore constructs his refrigerator with double spaced walls, forming therebetween a reservoir through which the water is passed. Suitable inlet and outlet pipes lead to this reservoir. The pipe F being the inlet and G the outlet, the former connecting with the water supply pipe of the house. The outer wall is protected with a covering of



wood, asbestos or other suitable material for the purpose of keeping the water cool, while the inner wall is of thin metal unprotected so as to allow the water to come as closely as possible into direct contact with the inclosed air to take up the heat contained therein. A novel form of cover is provided for the structure, comprising an angle band that fits upon the top of the same to hold the covering in place.

Making Artificial Flowers.

ARTIFICIAL flowers, leaves, and plants form the most important article of export to the United States from Sebnitz, a town of 8,500 inhabitants 35 miles northeast from Dresden, close to the Bohemian boundary. The declared exports to the United States testify to the remarkable growth and development of this industry; in 1891, they amounted to \$97,037.61 and in 1900 to \$335,855.19, an increase of \$238,817.59 in nine years.

The origin of the artificial-flower industry, according to the most reliable statistics, dates back to about 1840, and was due to the immigration of a few makers of flowers from Bohemia. At first, only a very inferior grade was made, chiefly of tissue and thin colored paper. In time, the industry made progress, and business connections were effected with foreign countries. Sebnitz is now not only the center of the artificial-flower trade in Germany, but favorably competes with its French rivals. While it is admitted that the Paris

and when going through the largest factory one may notice only hand presses to cut out, emboss, and give shape to the leaf or blossom; also, quite an ingenious device for making cotton fruits, and a "tubing" machine, which makes flower and leaf stems of all shades. All the rest of the work, such as dyeing, coloring, stemming, shaping, shading, mounting, waxing, binding, etc., is done by hand.

Work is paid for by the piece—dozen or gross—and the earnings vary from \$7.50 to \$12.50 per month for females and from \$8.75 to \$20.50 for males, according to age, kind of work, skill, and diligence. Children under 14 years of age are prohibited by law from engaging at work in factories, and must have passed the term at the public school before they can obtain such permission.

The most important feature of the artificial-flower trade is the house industry, and it can safely be stated that two-thirds of the work is done outside the factories by families who are supplied with the cut material ready for stemming, shaping, binding, etc. A factory employing 100 persons in its establishment gives work to 300 or 400 outside. There is hardly a house in Sebnitz and neighborhood



The Waxing Department of an Artificial Flower Factory at Sebnitz.

finish, and especially the exquisite French taste, can not be excelled, yet Sebnitz places every year a very handsome selection of high-class novelties before the buyer.

Up to the year 1870, very little export business was done from Sebnitz; but the Franco-German war, disastrous to most branches of trade, was directly beneficial to the flower industry. During the siege, Paris could not fill orders and Sebnitz was called upon to supply the demand. This gave a remarkable impetus to its trade. At the present date, there are some 430 manufacturers of artificial flowers, leaves, plants, fruits, etc., in Bohemia, of which 330 are located in Sebnitz and neighboring villages and 100 in Dresden and suburbs. The largest manufacturers employ from 250 to 1,000 persons. The total number of persons engaged in the trade is estimated at 10,000, the larger proportion being females.

Practically no machinery is used in the manufacture of artificial flowers,

where artificial flowers are not made, and even the farmer who works in his field in summer time, makes flowers in winter.

The tools used for cutting out the different shapes of leaves, parts of blossoms, etc., are made in Sebnitz and Dresden, and the largest manufacturer has over 500 different tools, some of which, especially those for cutting out fine fern leaves, cost as much as \$25 each.

The illustration represents the waxing department of an artificial flower factory located in Sebnitz.

Scouring Wool.

Methods of scouring wool by ozone have been adopted in France, and, it is said, with very satisfactory results. The wool is placed on screens in an air-tight receptacle, and the ozone is forced through the wool by pumps. The grease is converted into a liquid, and readily carried off, leaving the wool in good condition and the fibre soft and elastic. It is said that 1 lb. of ozone is required for scouring 2,000 lbs. of wool. The process leaves the fibre white, so that but a small quantity of sulphurous acid is required to bleach it a clear white after it has been scoured by this method.

How Marconi Perfected Wireless Telegraphy.

By the time he was sixteen, Guglielmo Marconi had modeled various instruments which were undoubted evidences of his latent genius. They showed an insight into mechanical problems far beyond his years, and were of sufficient promise to be worthy of the encouragement of his friends. It was not until he was twenty, however, that his great life began directing its energies toward the problems of wireless telegraphy. At that age he became interested in the work of Professor Heinrich Hertz, a German scientist, who, in attempting to discover the nature of electricity, accidentally produced electric, or electromagnetic waves, and detected their presence in the ether by means of a wire loop so broken that the electricity sparked across the gap. No one, not even Hertz himself, realized the tremendous importance of his discovery. Men like Professor Lodge, Lord Kelvin, Sir William Preece, Popoff, and others prominent in electrical science, talked about Hertz's work, and some of them reproduced his experiments, but it remained for this young Italian dreamer to jump across the gap of years of scientific study and make practical the most important discovery since Faraday invented the induction coil. When one remembers that the induction coil made possible the dynamo, electric lights, the telegraph, and the telephone, the significance of the comparison is apparent. Hertz's discovery was the beginning of wireless telegraphy. No one knows that better than Marconi himself. He does not wish the credit of originality in this matter, but he deserves all the credit and praise the world can bestow upon one who has made a theory practical by conquering unexpected difficulties by unremitting perseverance.

Marconi read of the work of Hertz early in 1894, when he was barely twenty years of age. How the thought came to him that there was a principle which could be applied to communication over great distances, no one will know. Looking back on it, in the light of what he has done, the thought seems most natural,—even absurdly simple. Hertz detected a spark in a broken hoop, a few feet away from the flash of an induction coil. Why didn't he get a better detector than a broken hoop, and a better transmitter than a small induction coil, and send out the flashes in such a manner that the detector would record a message? Why, indeed? Perhaps, if Hertz had lived, he might have thought of the possibilities of his discovery; but, in the few months of his life which followed his greatest experiment, the important thought did not come to him. Herein, it seems to me, lies the distinction—that small differentiation which is all-important,—between a great man and a genius. The former, by a long struggle, almost gains the height; the latter leaps to it, by the spark, divine or superhuman, which his brains possess. Why didn't Prof. Lodge, or Lord Kelvin, or Sir William Preece, or anyone of a hundred of the other great scientists of the time think of utilizing Hertz's discovery? Marconi, himself, when the thought occurred to him, believed that the idea must have come or would come to one of these. He was not an electrician himself. It seemed presumptuous to try.

He waited almost a year, all the time turning the matter over in his mind,—all the time watching for the announcement of a system of wireless telegraphy by Hertzian waves,—but none came. The young man became impatient; and, more because of the genius burning within him for outward expression, perhaps than that he might outstrip others, he began the experiment. This was in December, 1894.—*Herbert Wallace, in "Success."*

Improvements in Electric Incandescent Lamps.

There has been but little improvement in the efficiency of the electric incandescent carbon filament lamp during the past ten years. In that time, it is true, a number of mechanical improvements have been worked out, and commercially practicable lamps for 200-volt circuits have been placed on the market, broadening the field of usefulness of the lamp; but its efficiency and durability are probably reduced rather than enhanced by the increased electrical pressure. The average efficiency of the carbon filament lamp remains at from four to five watts per candle-power, and its average life is less than 400 hours at this mean efficiency. This is the equivalent of 9.3 to 11.7 16-candle-power lamps per horse-power, a low efficiency, of course, but the exceeding simplicity of lighting and extinguishing this lamp, and the ease of effecting renewals, in which it is much superior to the Welsbach gas lamp, together with its other advantages as an illuminant over gas, have been its chief popularizing feature. Inventors have, however, long been seeking to devise an incandescent electric lamp of higher efficiency than that possessed by the carbon filament lamp, and in this some of them appear to have been successful, but at what cost as regards simplicity, reliability, color or light, and economy remains to be demonstrated.

An inventor, has brought out an incandescent lamp which has shown very high efficiency. This lamp, the Cooper-Hewitt, employs mercury vapor in a suitable glass tube, or bulb, instead of a filament, through which an electric current is caused to pass. The current is led into the tube by wires sealed in each end, a small quantity of mercury being placed at one end of the tube. It is, however, found that a much higher electromotive force is required to start the current through this tube than is necessary to maintain the normal operating current after it is started. On this account a special device to obtain a momentary high electromotive force is requisite. The starting may, however, be facilitated, by warming the tube by means of a Bunsen burner, by employing a vapor of the sulphide of mercury, or in other ways. Tests of one of these lamps, a tube 54 inches long by 1½ inches in diameter, showed it to have a mean efficiency of about 0.55 watts per candle-power, which is equal to about 85 16-candle-power lamps per horse-power. When the current is passing through the tube, the vapor glows with an intensely bright light, which, however, unfortunately, is very poor in red rays, and hence everything red exposed to it—the lips, the ears, the cheeks, takes on a blue-black color.

The inventor has ascertained that a mixture of mercury vapor and nitrogen produces a rich, soft light. The light emitted by the mercury vapor lamp is quite rich in actinic rays, as excellent photographs have been taken with it with an exposure of but a few seconds; indeed, the light appears to resemble daylight in this respect.—*Cassier's Magazine.*

MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. SIGGERS, Washington, D. C.

Francis J. Clifton, Pittsburg, Pa. **Nut Lock**.—A design for an exceedingly simple, inexpensive and effective form of nut locking washer embodying a circular flat plate-like body having a central circular bolt opening into which extends a radial tapered projection which is integral with the plate and designed to enter a groove in the bolt, and also having three radial external wings or projections, one of which is projected in a direction opposite to that of the internal projection, and the others lie at opposite sides thereof, said wings being adapted to be bent up against the peripheral edge of a nut so as to interlock the latter with the plate, whereby the nut is held against accidental displacement as the plate is held against accidental rotation by its internal projection fitting in the groove of the bolt.

* * *

George D. Hayes, Hillsboro, Texas. **Baling Press**.—This press is arranged to be operated either by hand or horse power, or both, and the operating mechanism is so constructed that a maximum leverage will be attained as the plunger reaches the end of its stroke. During the first portion of its movement, the plunger advances rapidly in comparison with the movement of the operating mechanism, but as the plunger reaches the end of its stroke and is resisted by the compression of the bale, there is a corresponding gain of leverage, so that further movement of the plunger will be effected under immense pressure. The parts are so arranged that when the plunger has completed its stroke it will be automatically retracted, so that the hay may be fed to the press while the operating mechanism is being restored to its initial position for the compression of the next bale. The press also includes other novel features of construction which render the movement of the plunger practically anti-frictional, and insure the anchoring of the press in rigid position at any point where it may be desired for use.

* * *

John W. Clayton, Atlanta, Georgia. **Quilting Attachment for Sewing Machines**.—This patent covers an exceedingly ingenious attachment which enables an ordinary sewing machine to be employed for quilting. Mr. Clayton has taken out a number of other patents having the same end in view, but his latest attachment is by far the simplest and most efficient device which has yet been contrived for this purpose. It consists in a light frame for holding a quilt in position to be operated upon by the machine. This frame is suspended from a carriage or trolley, movable along an overhead track in the form of a wire extending between the opposite walls of a room. The quilt is wound from one roller to another journaled at opposite sides of the frame, and the machine operates upon that portion of the quilt which is drawn taut between the rollers. The frame is also equipped with a tension device for keeping the several layers of the quilt smooth and even during the sewing, and is designed to have limited swinging movement in a horizontal plane, so that if desired the lines of stitching may be curved, scalloped or otherwise fancifully formed to produce an artistic effect.

* * *

Benjamin F. Orewiler, Cleveland, Ohio. **Hose Supporter and Garment Clasp**.—Mr. Orewiler, whose reputation as an inventor is based on a number of successful patents, has just had

issued to him two patents. One covers a novel hose supporter comprising a hanger intended to be suspended from the last clasp of the corset, and having tapes or elastics extending from the hanger and arranged to be connected to the stocking by a novel form of clasp. The hanger is so arranged that it is supported by the corset clasp, as stated, and has interlocking engagement with one of the corset studs, which prevents objectionable swinging of the hanger. One of the distinguishing features of the invention is the provision of means whereby the hanger may be attached to a waist or other under-garment, in order to permit the use of the device by children, or other persons who do not wear corsets.

Mr. Orewiler's second patent covers the novel clasp for attaching the tapes or elastics to the hose. This clasp includes the usual loop and stud, but is so constructed that the tape may be attached to the clasp member without necessity for sewing, and the loop member is divided at its lower end to permit slight yielding thereof for the purpose of preventing injury to the stocking as the stud is being slipped to its holding position. The supporter, comprising the features shown in these two patents, is so simple and ingenious that its success as a commercial proposition would seem to be assured. Indeed, both inventions have been marketed during the past year, and the encouragement received has been of the most flattering character.

* * *

Charles Baer, Mendon, Michigan. **Blinders for Bridles**.—This is a simple and humane attachment for bridles, intended to avoid run-aways by permitting the driver to effect the blindfolding of a horse, upon the approach of real or apparent danger. A pair of rods are mounted upon the cheek strap of the bridle, and are provided at their upper ends with the blinkers or blinders normally held away from the eyes of the animal by means of springs encircling the rods. From the lower ends of these rods extend crank arms to which the ends of a strap are connected. This strap is extended back within convenient reach of the driver, so that upon the approach of danger, the driver may cause the blinkers or blinders to cover the eyes of the horse, and as soon as the strap is released, the springs will swing the blinders away from the horse's eyes.

* * *

Henry Barry, Inventor; George Eberhard, Assignee; San Francisco, Cal. **Door Knob Lock**.—This device is in two forms, one of which is applicable to any door, while the other is intended to be placed within any ordinary door lock. Both forms are arranged to lock the door knob shank against turning from the outer side of the door. Each form comprises an endwise shiftable trip device having an arm adapted to engage the door-knob shank and hold the same from being turned when the shifting device is at one limit. Upon the trip device is a pivotal gravity latch to engage a fixed pin or keeper at the locked limit of the trip, and there is also a ward plate having slots to receive the wards of a specially prepared key, which is adapted to be inserted through the ordinary key hole, and thereby to lift the gravity latch out of engagement with the keeper, and by turning the key, to shift the trip and release the door-knob shank.

* * *

Granville E. Medley, Gracey, Kentucky. **Fishing reel**.—Mr. Medley is an enthusiastic disciple of Izaak Walton, and his invention is the outcome of his personal acquaintance with the requirements of the angler. This fishing reel is a distinct novelty although it includes the line spool arranged to be rotated to wind in the line by means of either a motor or a manually-operated crank, as in all high class reels. The radical depart-

nre includes an ingenious arrangement whereby the angler may utilize the crank either to rewind the spool motor or to wind in the line manually, as desired. The handling of the reel during the hooking, playing, breaking down and landing of the fish is thus simplified and rendered easy. Another departure which is of great practical importance is the employment of a spool operating motor consisting of a plurality of springs geared to the arbor of the reel by multiplying gearing, and designed particularly to accommodate very long lines and to secure a high speed of the reel for an unusual length of time. All danger of derangement of the parts incident to the employment of the high power motor is removed, however, by an ingenious arrangement which automatically effects the disconnection of the motor and reel when the parts are subjected to an unusual strain.

* * *

Charles R. Doe, Mt. Pleasant, Iowa. **Freight Car Awning; Fastener for the End Doors of Freight Cars; Hand Trucks**. The first two patents are of interest to the freight handling departments of railroads.

The first patent covers the only temporary awning which has ever been devised with special reference to the protection of freight handlers and freight from snow and rain during the loading and unloading of freight cars, as for instance at warehouses or depots. Warehouse platforms are ordinarily protected from the sun, rain and snow by a roof or permanent awning provided with an eaves trough for preventing water from dripping from the roof upon the freight or the freight handlers in wet weather. The transfer of the freight from this platform to the cars has been rendered excessively laborious, and has subjected the handlers to considerable hardship and the freight to damage, particularly in inclement weather. The awning invented by Mr. Doe is arranged for attachment to the side of the freight car above the doorway, and is so constructed that the water, instead of dripping from the outer end of the awning, as usual, flows toward the car and is permitted to escape beyond the opposite sides of the doorway, where the droppings can not by any possibility annoy the handlers or damage the freight.

The second patent is for an ingenious fastening for the end doors of freight cars. By means of a simple arrangement the end door is automatically locked when shut, and although it can not be opened while the side door of the car is closed, it can be unlocked from the side doorway as soon as the side door is thrown back to its open position. The end door is provided with a moving locking member, and the actuating means for said member is extended to the side doorway of the car, and is normally retained in its locked position by a pin, access to which is guarded by the side door. Unauthorized access to the car by means of the end door is absolutely prevented, but when the side door has been opened by an authorized person, he may operate the locking member of the end door and open the latter for the purpose of properly ventilating the car.

The third patent marks an advance step in the construction of hand trucks. The platform of the truck is formed of longitudinal and cross bars protected on their upper faces by metal strips, the ends of which are bent beneath the bars so that the sharp corners will not engage with sacks or other articles placed upon the truck. Certain of the cross bars are provided with depressed portions, so that a barrel seat is formed, and braces are secured to the cross bars at the edges of the seat. By this specific arrangement, a very strong structure is provided that will withstand the rough usage to which trucks are subjected.

Hendrick Rodrigo, Houston Texas. **Lock**.—The invention relates to an auxiliary locking device for the hasp of a padlock, which is entirely independent of the main locking mechanism, so that should a person not acquainted with the lock be able to operate said main locking mechanism, the hasp of the pad lock could not be opened. The inventor has provided a sliding bolt which engages the hasp, and is operable from the outside of the casing, being connected to the cover for the key hole. The device is very ingenious, and may be modified in various ways.

* * *

Tilghman E. Branson, Belleplaine, Kansas. **Grain door for Cars**.—Many attempts have been made to improve this class of doors, but it is believed none heretofore have been as simple and effective as this one. The door is made of sections hinged together, said sections being slidably mounted on rods that are located on opposite sides of the doorway. The upper set of sections are entirely free, so that the door may be raised to the roof of the car and secured there in folded position, thus being entirely out of the way. When placed across the doorway, the sections are secured by means of upright bars detachably fastened across their inner face.

* * *

David D. Kimberlin, Hudson, Ohio. **Milk Aerator**.—In the February 1901 number of the INVENTIVE AGE, there was a description of an aerator devised along entirely new lines by this inventor. It consisted of a handle upon one end of which was pivoted an air cup, so arranged that when the device was plunged into a can of milk, the cup would be in an inverted position and would carry air to the bottom of the can. In this position the cup was tilted to release the air, which passing up through the body of milk, thoroughly aerated the same. A very broad patent was obtained on the arrangement, and the inventor has now patented an improvement, by which the cup is secured against movement upon the handle, so that the device may be employed for a dipper, thus increasing the usefulness of the invention.

* * *

John T. Conse, Cochran, Ga. **Milk and Butter bucket**.—This invention consists of a can-like receptacle provided with a tight fitting lid and having a plurality of circumferential beads or flanges. The lid of the receptacle is provided with the usual hand hold, and in addition a locking or clamping device which engages with a bail attached to the body of the receptacle, and operating to hold the bail in a vertical position. Within the receptacle is placed a supporting rack for containing the milk or butter to be cooled. The rack comprises two standards carrying open-sided, semi-circular pan supports. The bottom of the standards are connected by a base piece which rests on the bottom of the receptacle. The invention is particularly designed for use in country districts and is meeting with much success.

* * *

Lewis M. Theobald, Campbellsburg, Ky. **Lamp Bracket for Buggies**.—This bracket is of inverted L-shape and carries at its upper outer end a pendent U-shaped clip to embrace the rear spring bolster of a buggy, and is provided upon the top of its upper member and the outer or rear side of its vertical member with spring clips or tongues. An ordinary lantern is placed in front of the pendent bracket member with its bail embracing the top member and engaged beneath the spring clip thereof, and the circular wire of the lantern cage is engaged between the pendent member and the spring clip thereof, whereby the lantern is held against swinging movements and is disposed below the bottom of the buggy to cast the light upon the road in front of the vehicle.



The Inventive Age

AND PATENT INDEX.

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The Annual Report of the Commissioner of Patents

The report of Commissioner Allen contains numerous statistics, facts and recommendations, which should interest all as much as they do the practitioner. During the past year, the Patent Office issued 27,373 patents, which is the largest annual issue of its entire history. In addition, the record of trademarks, prints and labels registered was broken, the total being 2,965. Notwithstanding this evidence of increased work done by the examining corps, there was no increase of the force during the year. Instead of that, an increased burden was placed on some of the divisions. This is shown by the fact that of the thirty-six examining divisions of the Patent Office, twenty were working under rules requiring them to stay until five o'clock p. m., so long as their divisions remained over one month in arrears, for out of the thirty-six divisions, sixteen are within one month, nineteen are between one and two months, and one between two and three months behind with their work. This means that one hundred and twenty eight Examiners and assistants out of two hundred and nineteen are working over time to keep up the work of their respective divisions.

The Commissioner estimates that the work thus required beyond the regular hours of the department is equal to the working time of twenty persons working continuously for the regular department hours. As he says, "this condition is chronic and is due to the fact that the work has outgrown the Examining corps." Very properly the Commissioner recommends that "the number of Examiners should be increased to provide properly for this situation, which operates unfairly against a skilled body of employees of the Government and which may be reasonably expected to grow worse by the growth of the business of this bureau in accordance

with the general growth of the industrial arts of the country, of which it is an index."

"It is believed that to meet the necessities already pressing upon this Office, whereby its work may be kept up within the working hours provided by the rules prevailing generally in the departments of the Government, and to meet the requirements of the business of this Office for the fiscal year 1902-1903, there should be furnished the following additional force, viz: three Principal Examiners, of whom one shall take the place of an assistant now at the head of one of the Examining Divisions and the other two shall have charge of two new divisions to be formed. The following Assistant Examiners will be required: four First Assistant Examiners, eight Second Assistant Examiners, ten Third Assistant Examiners, and ten Fourth Assistant Examiners."

No friend of the American patent system can listen to this appeal unmoved. The Patent Office annually turns into the U. S. Treasury thousands of dollars. The balance for the year 1901 was \$152,012.52, and estimating the salaries of the additional Examiners as they are now rated, Congress would only have to appropriate \$53,500 to pay for the additional Examiners asked for by the Commissioner. This would still leave nearly \$100,000 surplus.

Instead of being a tax on the government, the increase in the force would take nothing from the U. S. Treasury, for it would be paid for out of the current revenues of the Patent Office. It was never intended that the Patent Office should be a money making institution, and it certainly seems reasonable that inventors should receive such benefit as would accrue to them by an increase of the force of the Patent Office. It would not only help inventors, but it would aid attorneys very much in their work. There is nothing more difficult for an attorney to explain than the delay in the obtainment of a patent, and prompt action on an application for patent would avoid much of this delay.

Exhausted Copies of Patents.

Commissioner Allen, in his report, refers to this matter as follows:

"This Office is in receipt of continual complaints from people who send for printed copies of patents, only to be answered that the desired copies are exhausted and cannot be furnished. The sum provided for this purpose is expended where it is most urgently required, for copies needed in the trial of cases in the courts and for other purposes rendering the request for reproduction special. A larger appropriation should be made for re-printing patents, so that eventually all exhausted copies may be restored to the files and be available as ordered."

Every one who transacts business with the Patent Office can speak of the delays in their work due to the failure on the part of the Patent Office to furnish copies of certain patents. In numerous cases the most import-

ant patents cited as references are missing. To the local practitioner this, while very inconvenient, is not so serious as to those outside of Washington. However, to every one the failure to obtain a printed copy of a patent cited as a bar, makes the work of prosecuting applications for patents more burdensome and slow.

When it is considered that these copies of patents are sold at five cents each to attorneys and inventors and that in this way the money paid out for reproducing the copies of patents is returned to the government, there would seem to be no good reason advanced why exhausted copies of patents should not be reproduced just as soon as an order comes in for their reproduction. Many years ago it was a rare thing for copies of patents to be exhausted. Now scarcely a day passes in the practice of any attorney that he is not informed on the filing of orders for copies of patents, that a number of the orders cannot be filled because the supply is exhausted. The proper remedy should be applied to cure this evil. It can be remedied by a fair appropriation, and friends of the patent system should aid the head of the Patent Office in his effort to obtain proper recognition at the hands of Congress.

If every inventor should write to his Senator and member of Congress, and urge their support of the recommendations of the Commissioner, much good would be done. No Senator or Representative could be engaged in a better business than protecting the interests of inventors.

Poor People's Lawyers.

In Boston they have a society whose aim is to provide, after careful investigation, legal aid to those helpless persons who are too poor to pay counsel to maintain their legal rights, and especially for those cases where small sums are due and unjustly withheld from persons unable to employ counsel, and in which a lawyer's reasonable charges for collection would be more than the sum collected.

A similar society has been maintained by charitable support in the city of New York for more than twenty years, and has proven to be one of the most effective benevolent organizations in that city. The number of cases receiving attention from its attorneys during the year 1899 alone was over nine thousand.

The first year's operations of the Boston society have been very satisfactory. The sum of six hundred dollars in actual cash has been collected for various applicants. Many matrimonial difficulties have been adjusted, and every applicant has had the satisfaction of obtaining competent legal advice. Like all charity work, the benefit cannot be estimated in dollars and cents.

There is a need for something like this in the patent business. Inventors as a rule are poor. Too poor oftentimes to patent their inventions. Many an inventor has been compelled to give away half of his invention in order to get the money to apply for a patent. The Electrical Age is giving

consideration at present to a plan for the establishment of an institution, presided over by men of national reputation in the arts and sciences, and to which inventors might submit their inventions for examination, and if deemed worthy, the institution would pay the cost of constructing a model and patenting the invention. There is much in this plan which is worthy of consideration, and we are pleased to note that a paper having the standing of The Electrical Age has taken it up.

The skill and inventive genius of his employees had much to do with the development of Andrew Carnegie's great wealth. Such an institution if endowed by one of our philanthropists, would not only aid many poor inventors, but would add materially to the prosperity of the country.

Automobilism in France.

The interesting fact is noted, in a recent United States Consular report from Rouen, that automobilism, directly or indirectly, maintains more people in France than any other industry. All the factories have tripled their output during the last three years, and manufacturers formerly making cycles now produce automobiles. At first, Paris was the only city where automobiles were made, but now Lyons, Bordeaux, Marseilles, Lille, St. Etienne, Nantes and Rouen have factories to supply local demands. By reckoning all the workmen in the various branches that are benefited by the automobile industry, a total is obtained of nearly 200,000 persons dependent upon it. The general consensus of opinion among the French makers is that the big machine is a thing of the past because of the restrictions upon speed. The demand is growing for a strong, light, and comfortable machine of moderate speed for general use.

American Skill Recognized by the Scotch.

Some of the leading American printing presses and other American machinery for the printing trade are manufactured in England by what is known as the Machinery Trust. This trust was organized about eight years ago with a capital of 2,000,000 pounds. It has been seeking by every possible means to enlarge its influence and widen the scope of its operations. A large printing and publishing house in Edinburgh which has long used American presses, folders, stitchers, etc., always buys its machines through the trust, but invariably demands that such machines must be not only of American design, but also of American manufacture. A member of this firm states that the superior skill of American workmen in fitting machinery of this kind is universally recognized. Although assured by the trust that the material used in the manufacture in England is precisely the same as that used in the United States, and that the work is done under the general supervision of American foremen, still he and his partners refuse to place confidence in the English-made machines, distrusting especially the workmanship.

SAFETY RAILWAY APPLIANCES.

THE annual report of the Interstate Commerce Commission has been issued, and that portion which treats of safety railway appliances is worthy of special consideration. The law, which became fully effective on August 2, 1900, required all railroads engaged in Interstate Commerce, to equip freight cars (all passenger cars had been previously equipped) with automatic couplers and air brakes.

The report shows that the number of employees killed for the year ending June 30, 1901, was less than in the preceding year by about thirty-five per cent, and the number injured was less by about thirty-two per cent. This is an extremely gratifying showing, and if the Interstate Commerce Commission had done nothing else during its existence, this alone would justify its birth and its continuance as a factor in our government.

The greatly increased security to life and limb by which the men on freight trains and in freight yards now perform their work is now apparent on every hand. Evidence of the improved conditions resulting from the practically universal use of automatic couplers on freight cars appears in the records of accidents and in the testimony of railroad officials and employees. Further proof from a financial standpoint is also found in the records of the railway claim departments, as well as in those of the several trainmen's associations.

This is due to the Federal statute, the railroad companies' united action, and the efficient performance of their duties by the inspectors employed by the Commission. These inspectors, who are competent men of long experience in car and train work, have taken note of all features of operation, improvements, and repairs which seem to be germane to the work in which they are engaged, and this has proven satisfactory to the railroad presidents and managers, and has resulted in establishing amicable relations with the employees. The various railroad technical associations, including the American Railway Association and the Master Car Builders' Association, have contributed in marked degree to the success of the law.

The Commission recognizes that as a rule the railroad companies now need no compulsion to induce them to use automatic couplers, and that it is only in details of a minor character that any road has assumed a critical or reluctant attitude. Both the automatic coupler and continuous power brake are now absolute necessities in the operation of roads which move long trains, or use the powerful locomotives and heavy cars which are now common.

The Commission recommends that this act be amended so as to specifically require the application of automatic couplers to locomotives and tenders. Although about seventy-five per cent of the locomotives and tenders have been equipped with such couplers, the amendment is desirable if for no other reason than to insure uniformity on all the roads. It is also recommended that the application of "handholds" be required on locomotives, tenders, and snow plows as well as upon cars. Both of these provisions, and also the requirement of a standard height for couplers might reasonably be made to cover all vehicles, passenger, freight, and mis-

cellaneous, which are hauled or propelled by standard locomotives.

Attention is called to defects in couplers, uncoupling mechanism, brake cylinders, or triple valves. Especial reference is made to the breakage of the "knuckle" on couplers, which often results from the fact that slots and holes are still left in the knuckles for the purpose of coupling with the old-fashioned link and pin, thereby diminishing the strength and security of the knuckle and of the coupler as a whole. The needs of the future in respect to couplers are strength, simplicity, and finish, the latter term being used with reference to the outer lines and greater smoothness.

Railroad officials complain frequently of rough handling of cars in the yards. With the general use of automatic couplers, relieving the men of the necessity of going between cars about to come together, it has become possible to quicken the work of switching by moving the cars much faster than formerly, and taking less care to properly graduate the speed of one car or a draft of cars as it approaches another. This condition is regrettable, not only on account of damage to the cars, but because it produces an element of danger to the men. The breakage of a timber or loosening of a bolt or other fastening may not be discovered until it has caused a derailment while running on the road at high speed. The remedy for this fault lies chiefly in greater discipline of the men while handling the cars.

Considerable space is devoted to the subject of air brakes, and the Commission says that the air brakes on freight trains has long been in need of a decided improvement. Trains have often been run with only a few cars air-braked, when, but for insufficient inspection, a very much larger number could have been made available. A harmful practice in connection with air-brake hose, which unfortunately, seems to be on the increase, is noted. This results from pulling one car away from another without disconnecting the hose couplings, but leaving those couplings to separate automatically. While such separation is theoretically provided for in the design of the coupling, the hose is strained and frequently loosened at its fastenings, so that defects are produced. This introduces an element of constant danger while trains are running, for the accidental rupture or parting of a hose while the train is in motion is sure to cause sudden stoppage, and the resulting shocks are quite liable to cause derailments or other damage to the cars. The retaining valve is a valuable additional safeguard, and on every steep grade a necessity, but it appears that only a few roads have as yet made regular and systematic use of these valves.

Another cause of unsatisfactory service is found in deficient arrangement at yards for testing the brakes. The systematic maintenance of air brakes on freight cars requires the intelligent cooperation of all who have to do with making up, movement, and distribution of trains. The running of trains partially air-braked is a practice which is still tolerated everywhere. The balance of economy is probably in favor of running trains partially air-braked, rather than with no air brakes, but such a dangerous condition must be obvious to every railway manager. Some companies, particularly in the East, are still controlling trains on steep descending grades by the use of hand brakes. This is in disregard of the lessons of experience on many roads in the West, and is contrary to the advice of expert engineers. An object of the safety-appliance act was to provide for the use of universal and continuous power brakes on all trains, and it is the purpose of the Commission to pay particular attention to this feature.

Attention is called to the benefits

accomplished by the establishment of a standard height for drawbars, and that the railroads had made good progress in that direction before the passage of the law. It is gratifying to be able to state that many railroads are introducing or extending the use of the block system, and otherwise improving their signaling appliances, all of which decrease the dangers of train movement and makes the duties of the men simpler and easier.

Although the regulation, when proposed, met with considerable opposition from the railroads, the policy of Congress in enacting the law has been fully vindicated. There are many inventors throughout the United States who have given their time and money to devising a car coupler. The records of the Patent Office show that more car couplers have been patented than any single line of inventions. While, of course, only a few of the couplers were successful, inventors generally will be interested in learning that their efforts in behalf of the railroad men have not been in vain.

The Oldest Steam Engine at Work.

Last summer, much to my surprise, while at the Glasgow Congress of Engineering, and directed by the excellent hand-book prepared for the guidance of members of the Congress, a real live Newcomen engine was discovered at a colliery at Rutherglen, near Glasgow. It is almost certainly the oldest engine now at work and is really a quite remarkable case of the survival of the unfittest.

A few years ago an engine of James Watt's manufacture, with sun and planet wheel complete, was taken down at a London brewery. It had been continuously working for 102 years, and was not at all decrepit when dismantled. It now forms an archaeological exhibit in the museum of Sydney University. But this engine, though interesting and of about the same age as the Glasgow Newcomen, was of a comparatively modern type. It did not represent an extinct race.

The Newcomen engine at Farnie Colliery, Rutherglen, was built in 1809, and has worked continuously to the present time. As it was constructed long after Watt's invention of the separate condenser, it may, perhaps, be inferred that one object in its design was to escape payment of royalty. Curiously enough, unlike all other Newcomen engines of which there is record, it is a winding, not a pumping engine. The cylinder is of pure Newcomen type, but there is a modified Watt parallel motion with the radius bar above the beam, and a crank and fly-wheel of comparatively modern type.

The cylinder is 3½ feet in diameter, and the stroke 6 feet. It takes about thirty-five seconds to raise coal from the bottom of the pit to the ground level. The cylinder was never bored, but it has now a beautiful internal surface, having worn out probably a thousand packings. The piston is packed with hemp gasket, and carries a layer of water on top, which makes it quite steam tight. There is no automatic valve gear. A single handle worked by a man, opens alternately the steam and injection valves. There is no air pump. Gravity and the pressure of the incoming steam drive out the condensed steam and injection water through a flap foot-valve. It is stated that except brasses and one or two spur wheels, broken by accident, no important part of the engine has been renewed since it was built.

The beam is about 17 feet long and the fly-wheel is 15 feet in diameter. There is a feed-pump worked from the beam. The latter is carried on a masonry pier. The engine works quite smoothly and well, and, strange as it may seem, it is probably, for the intermittent work it is doing, not so extravagantly wasteful as might be supposed.—W. C. Unwin, in *Cassier's Magazine*.

Facts About French Patents.

Inventors who have secured French patents may or may not have noticed the letters "S. G. D. G." printed thereon. These letters have a distinct meaning, to wit, "Without the guarantee of the government," that is to say the patents delivered by the French government are not guaranteed by the government, which delivers them at the risk and peril of the applicant, no examination being made by the French patent office to determine the novelty of the invention claimed in an application for patent.

The new regulations concerning the preparation of drawings for applications for patents in France require that one of the duplicate copies shall be printed in black ink of good quality, on bristol board, so as to allow for reproduction "by photography." This means that the French Patent Office will, in the future, follow the practice of the English, German and United States patent offices by printing their patents. This will be a distinct gain in favor of inventors, as it will enable them to obtain printed copies of French patents in the future.

Under the French law, a French patent must be worked within two years. Formerly this has been honored more in the breach than in the observance of the law, by adopting a subterfuge known as "nominal" working. The Court of Lyons has, however, recently rendered a decision bearing on this practice. It has decided that the working must be real, and that the publicity due to the cession of the patent to another party is not sufficient.

The requirement as to the working of patents is a very serious problem confronting American inventors who patent their inventions abroad. It has always seemed to us that we placed aliens on a better standing than we occupy in their countries. For instance, a Frenchman may secure an American patent and hold it for the full term of seventeen years without attempting to work it, and yet at any time during the life of the patent, he may awake from his sleep and put the invention in practice or sue anyone for infringement. But an American, if he applies for and secures a French patent, must actually practice the working of the invention in France within two years, or forfeit his patent right. Imagine an inventor taking out a French patent on a ship, which would require thousands of dollars to effect the real working, and just because he is unable to build the ship, he must lose his patent. While such provisions work against the inventors of every country, they are particularly onerous on aliens. Cannot the treaty-making powers of this country make some move in this matter.

A treaty should be negotiated with France to have such laws applied with less rigor against Americans, or our own laws amended so that applicants for patents, who are citizens of those countries where working is made a condition precedent to the maintenance of the term of the patent, should be required to carry on the working of United States patents. Some such addition to our own laws would cause European inventors to make a move towards abolishing the onerous provisions of their laws relative to the working of patents.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies for \$1.50.—Please give correct data in ordering.—Address
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Lamp. Incandescent electrode vapor electric..... P. G. Hewitt
Lamp socket..... H. P. Clausen
Lamp socket. Incandescent..... N. Marshall
Leather stretching machine clamp..... R. L. Braucht
Leather treating machine..... H. A. Ballard et al
Leather working machine..... H. A. Ballard
Leather working machine..... E. E. Chain et al
Leno selvage motion..... H. H. Sutcliffe
Lens grinding machine..... F. G. Wilson
Lenses accurately in relation to their focal center while being cut. Apparatus for cutting elliptical or other shaped..... J. West
Lenses. Apparatus for determining and marking focal center of spherical..... J. West
Lenses. Machine for forming and finishing edges of..... J. West
Lenses while such lenses are being shaped and edged. Apparatus for attaching holding devices to..... J. West
Level and plumb..... J. V. Janin
Level. Spirit..... D. Lesh
Life preserver..... C. Gore
Life saving apparatus..... I. W. Macolini
Lighting device..... B. S. Philbrook
Lime, cement, or like kiln..... I. Isserlis
Liquid concentrating apparatus..... W. Veruleth
Lock..... 2 pats..... A. R. Fergusson
Lock..... E. F. Rogers
Loom..... E. Wackerhagen
Loom picker..... F. A. Wardwell
Loom weft replenishing mechanism..... C. & G. Brun
Lumber jointing and sizing machine..... R. S. Hill
Magnetic separator..... F. A. M. Schiechel
Magnetic separator..... G. Grondal
Mail bag catching and delivering mechanism..... G. R. Moore
Mail marking machine..... C. V. Fyke
Mailing package..... O. Marsteller
Match box..... C. Schaar
Measuring device. Liquid..... C. Dyer
Medicating water. Tank for..... C. W. Perkins
Melting furnace. Brass founder's..... A. J. & E. H. Weatherhead
Menograph..... W. H. Smyth et al
Metal blanks. Machine for forming, shaping, hardening, and tempering..... E. E. Fay
Metal cutting, punching, and shaping machine..... F. Bowen
Metal into molds. Apparatus for pouring..... J. V. Coleman
Milk can..... C. H. Bagley
Mixer and kneader..... L. Cohnhoff
Motor feed regulator..... W. E. Gibbs
Muzzle. Horse..... H. Bark
Nail cutter and file..... E. Fouquignon
Neckwear..... J. A. Turner
Nippers..... G. J. Capewell
Nitro compounds. Reducing..... H. Gerresheim
Nut tapping machine..... J. Stephens
Oak. Bow facing..... O. B. Shedd
Oil. Extracting cotton seed..... E. L. Johnson
Oiler. Saw..... W. G. Clements
Ordnance. Means for positioning and firing heavy..... T. M. Foote
Ore crusher..... E. E. Hanna
Ore roasting furnace..... J. P. Cappean
Packing tube. Rolling..... A. Sharp
Pail and lantern. Combined dinner..... W. Williams
Paper and making same. Testing..... K. Dieterich
Paper making machine..... C. E. Barrett et al
Paper making machinery. Roller for..... W. E. Sheenan
Paper package. Toilet..... F. Schilz
Paper pail covers or circulars. Manufacturing lace..... J. Hess
Paper pulp. Apparatus for purifying..... A. Aberg
Pattern cutting machine..... J. Sullivan
Penholder..... C. W. Barkley
Pencil holder..... J. W. Pearson
Pencil sharpener..... A. T. Fox
Pencil sharpener. Automatic..... C. S. Cox
Photograph apparatus..... A. B. Robinson
Pick, &c. Prospector's..... F. S. Goldsmith
Pictures. Making..... B. Hawley
Pigment and the production thereof from terrous liquors..... A. S. Ramage
Pile fabric. Woven..... W. T. Smith
Pillow or cushion. Sofa..... C. E. Bentley
Pipe connection..... A. W. Cram
Pitman..... P. D. Jones
Plaiting apparatus..... A. W. Chambers
Plant chopper and thinner..... A. H. Meade
Planter. Corn..... D. & Somers et al
Planter. Corn..... S. McNaghten
Pliers. Bending and cutting..... S. M. Decker
Plover bar. Adjustable..... J. H. Powell
Plow cultivator attachment..... R. S. Bonner
Propeller shaft reversing apparatus..... J. Titus et al
Propulsion of ships..... F. Homer
Pulverizing apparatus..... W. F. McClellan
Pumping and dredging apparatus..... G. A. Farwell
Pumping engine. Compensating high duty..... G. de Laval et al
Push button switch..... M. Guett
Rail joint..... B. Wolhaupter
Rail joint..... H. Tiedemann
Rail joint clamp..... W. S. Jones
Rail joint connection..... J. T. Blake
Railway. Elevated..... J. N. Valley
Railway spike..... D. F. Vaughan
Railway switch. Automatic..... C. Schwarz et al
Railway switch. Three-way..... W. F. Bossert
Railway switches. Device for operating street..... W. E. Schilling et al
Railway tie..... J. J. Ridgway
Railway tie plate..... W. S. Jones
Railway tie plate..... B. Wolhaupter
Razor finder..... C. Davis
Razor. Safety..... F. J. Halbekann
Reflector..... J. L. Creveling
Releasing mechanism. Time..... S. S. Colt
Repair tool..... F. Hoover
Rock or ore braker..... A. J. Gates et al
Rolling apparatus. Metal..... J. Morgan
Rolling direct from fluid metal. Apparatus for continuous..... C. W. Bildt
Sad iron..... A. Luethi
Saddle. Harness..... E. A. Spaulding
Saw. Hand..... W. C. Buell
Saw set..... L. H. Price
Sawing machine..... E. G. Herbert
Scale. Liquid..... W. Buschmann
Screw. Jack..... G. L. & S. W. M. Kolleck
Seal press..... A. B. Schofield
Seed drill scraper..... W. Stephenson
Sewing machine fan attachment..... G. Gear
Sewing machine. Needle-feed chain-stitch..... H. J. Hancock
Sewing shank-eyed buttons. Machine for..... J. Mathison
Shaft coupling..... J. Kennedy
Sharpener. Knife or scissors..... C. A. Payne
Shavinas. Apparatus for the production of spirally wound..... C. Etzold
Sheet metal elbow..... O. H. Lawrence
Sheet metal plates. Machine for bending..... A. Swoboda et al
Shoe..... M. J. Moloney
Siphon attachment..... H. C. Tuller
Slide loop clip..... I. Goures
Snap hook..... W. A. Schleicher
Spool holding frame..... P. D. Morton
Spring for pillows, cushions, &c..... J. H. Masland
Square. Carpenter's..... H. Smith et al
Stacker. Straw..... M. Heineke
Stamp carrier and applier. Postage..... J. H. Lasseot
Stave drying apparatus..... W. H. Hines
Steam boiler..... F. Burger et al
Steam engine..... R. T. Abell
Steam for rotary motors. Mechanism for admitting or shutting off..... J. B. Zura
Steam generator..... W. Morgans
Steel. Preparing solutions for the treatment of..... B. K. Jamison
Steel process. Open hearth..... J. L. Smith et al
Steel trap..... E. Lewis
Stencil sheet cutting and printing machine..... W. S. Pain
Stocking..... J. Shelton
Stone puller..... H. P. Stroh et al
Stove or range. Cooking..... G. E. Wilbur
Stove regulating device. Gas or vapor..... G. Tresenreuter
Stove urn..... A. T. Matthews
Switch mechanism. Electric time..... P. Sorensen
Telegraph apparatus. Electric..... P. Picard
Telephone circuit..... W. K. Cook
Telephone switch and lock out mechanism for interconnecting lines. Individual..... A. K. Andriano et al
Telephone system..... F. E. Mayberry
Telephony..... I. Kitsee
Thread cutter..... C. P. McKim
Threshing machine..... G. F. Conner
Threshing machine feed device..... J. F. Welch
Tile roofing..... J. W. Carnes
Time recorder. Workman's..... H. Dyson
Tin. Regaining..... P. Bergsoe
Tire equipment for vehicle wheels. Rubber..... J. G. Webb
Tire. Pneumatic..... A. Ducasle
Tire valve cap..... G. H. F. Schrader
Tobacco stemming machine..... C. R. Spencer et al
Torpedo boat..... T. J. Moriarty
Torpedo. Railway..... E. A. Schooley
Toy..... J. H. Bowes
Toy..... H. T. Gay
Toy..... H. G. Sammons
Transit apparatus. Tubular..... B. H. Blood
Trimerhyl hexahydroxybenzylamine and making same..... G. Merling
Trolley pole base..... J. D. Buckley et al
Trolley pole controlling device for cars or vehicles..... W. H. Kilbourn
Trolley tender..... 2 pats..... A. W. Ham
Trommel..... G. F. Waddell
Truss. Hernial..... R. Hummel
Tutting apparatus..... S. Karpen
Tug attachment. Shaft..... A. S. Bailey
Tunnel..... C. M. Jacobs
Type casting machine matrix carrier..... G. H. Ziegler
Typewriter alignment mechanism..... C. Sears
Typewriter tabulating attachment..... J. A. Garland, Jr
Umbrella gear..... S. S. Freiz
Veive. Automatic relief and condenser..... W. S. Montgomery
Valve. Balanced puppet..... A. Metz
Valve. Compound engine..... S. Munson
Valve for air compressors. Piston..... B. L. & W. P. Brinton
Vehicle body corner joint..... J. F. Watts
Vehicle controlling device. Motor..... W. A. Hatcher et al
Vehicle. Motor..... G. F. Tadini
Vehicle running gear..... M. Brunner
Vehicle steering mechanism. Motor..... F. R. Hiester
Vending machine. Coin controlled..... A. C. Carey
Ventilating apparatus..... J. A. Hart
Veterinary remedy..... R. H. Fox
Wagon. Dumping..... D. S. Watson
Wagon. Sand..... S. W. Albers-ton
Waistband for pants. Supplemental..... S. Schelinsky
Warp threads. Device for correcting improper registry of party colored..... H. Hardwick
Washboard..... P. J. Collmann
Washing machine..... D. W. Bovee
Watch maker's lathes. Tail stock for..... W. D. Clement
Water elevator. Compressed air..... J. L. Latta et al
Welding. Electric..... R. M. Hunter
Well casing head. Oil..... J. W. Frye
Wheat. Machine for separating cockle from..... W. W. Climençon et al
Wheel fastener..... A. M. Beebe
Wicker chair. Knockdown..... C. Werthner
Windmill..... E. H. Han
Windmill power..... C. Oberlander
Window..... E. A. Sanders
Window. Ventilating..... E. A. Giesser
Wood. Inlaying of..... H. C. Webb
Woodworking machine safety device..... T. B. Rice, Jr
Wrench handle..... 2 pats..... F. L. Coes

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Axle center and fifth wheel plate..... H. F. Weeks
 Brush back and handle..... H. J. Herbert
 Buttonhooks, &c. Handle for..... F. Thiele
 Cabinet, Kitchen..... J. A. Reid
 Hot water bag closure..... C. W. Meinecke
 Lamp fixture..... W. Hawks
 Mirror frame..... H. J. Herbert
 Newspaper holder..... O. Orenshaw
 Penholder..... N. Jackson
 Pincushion..... G. Brown
 Registers, ventilators, &c. Top plate for..... H. S. Hart
 Rug..... 2 pats. A. Petzold
 Sideboard ornament..... F. M. Bomenblit et al
 Skirt, Lady's..... C. C. Omdrak
 Spoon, Souvenir..... J. A. Oswald
 Stove door..... J. P. Onerbacker
 Vessel's hull..... C. J. H. Flindt

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Advertising device..... A. C. Huckstepp
 Aluminium hydrate, Making..... H. W. Jordan
 Aseptic preparation from pancreas and producing same..... W. Weber
 Automobile steering gear..... J. Barsaleaux et al
 Autotype plates, Manufacturing..... E. Ehlermann
 Bailing press..... I. V. Jones
 Bananas, &c. Device for transporting..... R. R. Bandy
 Bar fixture with soda water dispensing apparatus provided with syrup cans..... J. C. Johnson
 Basket blank weaving machine..... R. & W. F. Goddard
 Bearing for crank shafts, &c. Roller..... G. H. Reynolds
 Bedstead brace..... I. W. Campbell
 Bedstead hook and lock, Iron..... G. Williams
 Beer vots and pipes, Cleaning..... S. A. Sjo et al
 Beet blocker..... W. W. Bartlett
 Belt holder and skirt support..... T. F. McEvilly
 Bevel..... N. B. Norfolk
 Bicycle attachment..... A. P. Christiansen
 Bicycle coaster brake..... A. F. Wyman
 Bicycle lock..... O. H. Hansen
 Billiard table, Pool..... W. L. Dethloff
 Blanket..... J. H. Dailey
 Blasting cartridge, Safety..... T. F. Duiham
 Blind, Venetian or like..... R. G. Conveyer
 Block..... P. J. Macdonald
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 Boiler furnace, Steam..... T. G. Macy
 Boiler furnace, Steam..... J. J. Le Duc
 Boiler tubes, &c. Implement for cleaning..... W. Lombardo
 Book, Carbon copying..... A. R. Turk
 Book cover, Detachable..... G. A. Roedde
 Boot or shoe treeing machine..... H. A. Ballard
 Boot or shoe treeing machine..... W. A. Copeland et al
 Boring apparatus..... F. Holbrook
 Bottle, Non refillable..... W. C. Leak
 Bottle washing machine..... S. Lippert et al
 Breast strap slide..... T. Huberdeau
 Brown covers, Woven fabric for..... W. B. Fitz
 Calipers..... F. Weimar
 Camera, Photographic..... F. A. Brownell
 Capsule..... R. B. Wilson
 Car, Convertible..... J. A. Brill
 Car, Low side gondola..... G. I. King
 Car seat..... H. S. Hale
 Car side bearing, Railway..... F. K. Fassett
 Cars, Means for driving generators placed upon cars by power taken from the..... J. L. Creveling
 Cars, &c. Means for propelling..... E. Hayward
 Cartridge belt..... A. Meyer
 Castings, Apparatus for making..... J. J. Caroll
 Cement, Composition of matter for..... J. D. MacDonell
 Chair wheel attachment, Child's high..... I. M. Clark
 Chatelaine catch..... J. E. Ortnor
 Chocolate coating machine..... J. L. Deru
 Chuck, Drill..... J. A. Craig
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 Cinematograph..... H. Schmidt et al
 Cinematographic apparatus..... A. Rosenberg
 Circuit making and breaking handle..... R. E. Leve
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 Clarinet..... W. Meinl
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 Clutch, Friction..... C. Ridderhof
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 Cock, Gas fixture..... J. D. Sturges
 Coin counting, registering, and wrapping machine..... C. S. Badorf
 Collar, Horse..... F. Maussner
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 Columns, Compo cap for mantle..... E. S. Kennedy
 Columns, Forming compo caps for..... E. S. Kennedy
 Columns, Mold for compo caps for mantle..... E. S. Kennedy
 Comb cleaner..... H. Hess
 Composition of matter..... H. A. Hughes, Jr
 Confectionery cutting machine..... R. Snedden
 Controlling system..... T. von Zweigbergk
 Cooker, Steam..... A. B. Hower
 Cooling safe or chamber..... R. Menz
 Cork disk cutting machine..... R. S. Anderson
 Corn silking machine..... J. H. Magee
 Cotter pin..... S. S. Pickering
 Crushing machine..... M. G. Bunnell
 Currents, Apparatus for determining the frequency of alternating..... H. S. Carr
 Curtain pole..... A. M. H. Culp
 Cuspidor..... O. L. Sues
 Cuspidor holder and cleaner..... L. & J. Tessier
 Dental floss holder..... A. Baumeister
 Dental instrument case..... A. J. & H. Aderer
 Dental pliers..... A. J. & H. Aderer
 Derrick..... C. A. Bills
 Detector bar clip and link..... W. H. B. Lavarack
 Die..... A. Rogers
 Dish washer..... A. Dierkes
 Display rack, Adjustable..... C. E. Perrin

Disolaying samples of carpet, &c. Apparatus for..... F. Ames
 Drapery hanger..... C. Y. Whiter
 Drill..... W. M. Potter
 Dry kiln..... J. J. Curran
 Dust collector..... O. Porbeck
 Dynamos from car axles, Means for driving..... J. L. Creveling
 Dynamos from car axles, Means for driving..... J. L. Creveling
 Egg opener..... W. A. Kendrick
 Elastic joint..... C. La Dow
 Electric battery..... A. de Dion et al
 Electric cut out..... H. E. Leppert
 Electric signal, Automatic..... F. E. Weinel
 Electric traction..... B. Cravellier
 Electric traction system..... C. M. J. (dit Claudiu) Limb
 Electrical condensers, Manufacture of..... J. Coates
 Electrical condensers, Manufacture of..... E. Thompson
 Elevator car braking mechanism..... O. M. Fritsch
 End gate fastener..... W. B. & E. A. Nichols et al
 Engine bearing and adjusting means therefor..... C. Robinson
 Engine igniter, Explosive..... J. T. Metcalf
 Engine indicators, Card for steam..... C. B. Bosworth
 Engines, Electric igniting device for explosive..... J. M. Smith
 Engines, Igniter controlling mechanism for explosive..... J. Walrath
 Excelsior making machine..... J. R. Bate
 Eyeglasses..... L. F. Add
 Fabric stiffening composition..... J. D. Graber
 Fan..... T. R. Aeyant
 Fan or pump, Rotary..... S. C. Davidson
 Fare indicator..... O. Kuntzen
 Fastenings, Machine for inserting metallic..... L. A. Casgrain
 Faucet and valve..... E. A. Pohlman
 Feed distributor..... W. B. Campbell
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 Fence..... D. L. M. Tisworth
 Fence, Portable cable anchor..... A. L. West
 File case..... J. A. Hoffman et al
 File or rasp cutting machine..... J. Greene
 Filter, Metallurgical..... F. H. Long
 Filter and regulating device..... M. M. Brophy
 Fireproof floor..... O. Hoff
 Fish plates in the process of manufacture, Apparatus for cooling..... R. B. Charlton
 Fishing float..... A. N. Pacetty
 Float, Glass..... J. M. Burr
 Floor covering..... M. Barnett
 Flue cleaner..... C. S. Goodfellow
 Fly wheel..... C. Robinson
 Folding box..... J. T. Ferrer
 Friction brake..... F. L. Whitmore
 Fruit gatherer..... J. D. Carter
 Fruit jar and cover..... J. A. Donald et al
 Fruit picking sack..... E. Harter
 Furnaces, Apparatus for controlling iron in blast..... L. Lincoln
 Furnaces, Apparatus for supplying air to steam generator..... C. Voet
 Furnaces of steam boilers, &c. Draft apparatus for..... J. W. Stock
 Garment stretcher..... W. D. Ashworth
 Gas engine..... C. Robinson
 Gas generator, Acetylene..... W. W. Cozins
 Gas governor..... J. Zander
 Gate..... A. J. & W. H. Russell
 Gear for belted machines, Driving..... F. Frigerio
 Gearing..... A. T. Brown
 Gearing..... L. Jones, Jr
 Gearing, Variable speed..... C. Upton
 Glass, Apparatus for delivering melted..... C. W. Foster
 Glass bottles, Finishing mold for making..... L. Grote
 Glove fastener..... 2 pats. W. B. Murphy
 Grain drill distributor..... C. E. Patric
 Granite, Artificial..... M. Arnn
 Guns, Ammunition conveyor or rammer for..... J. Becker
 Hair fastener..... J. Leick
 Handle fastener..... L. Herrman
 Harrow, Spike tooth..... T. D. Jones
 Harrow tooth fastening..... S. D. Poole
 Hat fastener..... E. Hart
 Hat, Miner's..... A. Harris
 Hay distributor..... N. C. Miller
 Hay loading apparatus..... E. H. Nicholson
 Hay loading apparatus..... F. S. Church
 Hay rack..... F. E. Bright
 Hinge..... J. C. Gillispie
 Hinge, Spring..... M. A. D. Kincaid
 Hog intestines, Utilizing..... P. F. Turner
 Hook and eye..... F. H. Gorrell
 Horseshoe..... T. F. Kenney
 Horseshoe, Nailless..... E. Ogbin
 Horseshoes, Device for altering the shape of..... S. Jannus
 Hose supporter..... J. R. Carolin
 Hose thimble expander..... H. W. Colby
 Hot air register..... L. D. Smith
 Hub..... J. C. Working
 Hydrocarbon motors, Electromagnetic regulator for admission valves of..... A. C. Krebs
 Inkstand..... J. L. Kerstetter
 Insulating conduits for conductors of electric tramways..... P. C. Seguy
 Jacquard machine driving mechanism..... J. Dean
 Jar closure..... R. H. Austin
 Jar or bottle closure..... H. A. Hughes, Jr
 Knitting machine splicing mechanism..... F. Wilcomb
 Lamp, Electric arc..... S. H. Johnson
 Lamp or oil heater burners, Wick stop for..... W. A. Penfield
 Lamp socket, Incandescent electric..... A. McKenzie
 Latch..... G. E. Ballard
 Lawn sprinkler..... A. Vandervoort
 Level, Spirit..... J. H. Jackson
 Link, Detachable..... W. H. Baker
 Linotype machine..... M. H. Whittaker
 Linotypes, Means for producing fudge or late news..... R. C. Elliott et al
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 Liquid separator..... C. J. Jennessen
 Log turner..... T. S. Wilkin
 Loom..... W. Fisher, Jr
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Loom, Filling replenishing..... J. Northrop
 Loom, Filling replenishing..... N. Ward
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 Loom picker, Pneumatic..... J. von Miniszewski
 Loom shuttle..... H. Bardsley
 Loom shuttle..... E. W. Davenport et al
 Loom warp stop motion..... J. V. & E. Cuniff
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 Lubricating pump..... J. F. McCanna
 Lubricator..... H. Ritter
 Lubricator..... T. S. James
 Malt drum..... F. Knüttel
 Marker for agricultural machines, Row..... F. L. Block
 Marking pin..... L. J. Davis
 Match box and cigar cutter, Combined..... F. H. Grothe
 Material of construction..... E. Thacher
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 Measuring tank and pump..... F. L. Wieburg
 Mechanical movement..... E. A. Mainguet
 Moistening and applying gummed paper, Device for..... A. Hoffmann
 Motion converting mechanism..... J. H. Baker
 Motion, Mechanical movement for converting..... J. T. Watts
 Motive power, Generating..... R. Stenersen
 Motor..... F. E. Wells
 Mower or reaper cutting apparatus..... W. M. Goehrend
 Nailing machine, reissue..... E. T. Freeman
 Necktie holder..... Z. Guzik
 Net, Dip..... S. W. Higgins
 Observatory, Balloon..... J. Greth
 Ore crushing and pulverizing machinery..... A. M. Beam
 Organ..... C. Stollwerck
 Ornamental structures, Device for forming..... L. B. Christopherson
 Oven furnace hood, Baker's..... F. E. Thomas
 Packing compound for eggs, &c..... J. M. Stukes
 Packing machine..... C. O. Ericson
 Packing, Machine for cutting material into strips for the manufacture of piston..... H. Dods
 Pail, Lunch..... P. Quarrelli
 Paper making machine..... A. Aldrich
 Passe partout..... T. K. Hastings
 Pasting machine..... A. W. Foster
 Penholder..... S. W. Durham
 Photographic shutter..... J. G. Siegrist
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 Pipe fittings, Manufacture of..... C. A. Dies
 Pipe jointer..... C. Vandall
 Plow..... R. Herrling
 Post securing device..... W. Newman
 Preserving organic substances..... A. Meszias
 Press for oleaginous substances..... G. W. Zoder et al
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 Printer's scale and gage..... J. L. Dodd
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 Pump motor..... G. W. Cook
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 Punching register..... C. Herst
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 Railway rail joint..... C. E. Bentley
 Railway switch..... G. E. Haynes
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 Railway track structure..... E. B. Entwistle
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 Ribbon holder..... A. F. Stockton
 Rifle, Magazine..... T. A. Eldjeland
 Road gate, Automatic..... J. E. De Lamar
 Roadway..... F. A. Malette
 Rock drill..... H. Leineweber
 Rolling metal ingots into thin plates or sheets..... E. Norton
 Rolling solid or hollow bodies, Apparatus for..... J. Gieshoidt
 Rotary cutter or pinking machine..... T. F. Hagerty
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 Sauer kraut, &c. Follower for packing..... I. I. Newfield
 Sawbuck..... M. Jinks et al
 Saw guide..... J. W. Manering
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 Seal, Car..... W. D. Doremus
 Sewed articles, Seam for..... J. L. Patterson
 Sewing machine folding guide..... J. L. Patterson
 Sewing machine thread cutter..... R. W. Thomson
 Sewing machine tucking guiding attachment..... C. Reinhold
 Sewing machine tucking guide..... C. H. Lewis
 Shaft coupling..... J. J. Cowell
 Ships, Apparatus for raising sunken..... M. Bourhanovsky et al
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 Silk reeling machine, Hot air..... J. P. Evertz
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 Snap..... H. A. Wroe
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 Spinning or twisting machine tension regulator..... A. C. Butler
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 Stove..... R. Winter
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 Teeth, Mount for diatritic..... H. M. Justi
 Telegraph system, Synchronous..... H. A. Rowland
 Telephone system..... 2 pats. G. Ritter
 Therapeutic application of smoke, Device for..... P. J. Schreiber
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 Tire..... M. E. Brocke
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 Tobacco drying system..... W. E. Martin
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 Tool, Motor fluid operated..... H. H. Vaughan
 Tool, Rotary..... F. D. Chambers
 Trace fastener..... L. C. Balingier
 Trace support..... H. Brooks
 Tramways or railways, Subterranean current..... A. Hrebicek
 Trees, Protecting..... T. J. Hubbell
 Trousers creasing device..... W. W. Fulton
 Truck, Baggage..... C. T. Godard
 Truss, Pile..... C. W. Langridge
 Tubes, &c. Manufacture of Seamless and weldless..... B. F. McTeer
 Type mold..... H. J. S. Gilbert Stringer
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 Type writer..... T. Consentino et al
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 Valve device..... A. J. Murphy
 Valve, Float..... C. C. Cecil
 Valve gear, Engine..... O. Jackson
 Valve Suction..... O. H. Castle
 Vehicle body, Metallic..... H. F. Eastman
 Vehicle box..... L. Priest
 Vehicle brake mechanism, Motor..... W. B. Mason
 Vehicle drag..... M. Leatherman
 Vehicle mud guard..... T. Cochran
 Vehicle wheel and tire..... C. Howells
 Vending apparatus, Coin controlled..... S. Newman et al
 Vessels, Apparatus for indicating, recording, and integrating the speed of..... R. C. E. Delany
 Wagon brake..... J. H. Jenner
 Wagon brake ratchet..... J. J. Shipley
 Wardrobe and travelling trunk, Combined..... E. Wolfgang
 Washing machine..... D. W. Hughes et al
 Watchcase pendant..... M. Sporleder
 Watchmaker's tool..... J. A. Wiedemann
 Water cooler..... T. F. McEvilly
 Water heater, Steam..... M. M. Brophy
 Water joint..... M. Garvey
 Water purifier and filter, Portable..... E. E. Holland
 Weighing machine..... W. F. Brothers
 Weighing machine..... C. O. Ericson
 Welding apparatus, Tube..... T. J. Bray, Jr
 Welding machine, Portable electric..... H. E. Meyers
 Wheel..... S. Furnidge
 Wheel controlling mechanism..... T. Quinn
 Whiffletree connection..... A. H. Shnel
 Windmill..... W. G. Bird
 Wire stretcher..... L. J. Bandemer
 Wood cutting machine..... E. Wuhmann
 Work holder..... N. P. Denckla
 Wrench..... W. H. Landor
 Writing machine..... E. B. Hess et al

DESIGNS.

Pillow facing..... 14 pats. C. E. Bentley
 Shingle..... G. F. Murdock
 Watch bag..... C. C. Drueding

Issued January 28, 1902.

MECHANICAL PATENTS.

Advertisement displaying apparatus..... H. W. Chinnery
 Aerating wort and improving the quality of yeast, Apparatus for..... M. Wallenstein et al
 Air and explosive engine, Combined..... R. Lundell
 Alloy..... G. W. Gesner
 Automobile seat..... O. F. Persson
 Axle box, Car..... J. W. Stephenson
 Axle for automobiles or other power vehicles..... D. M. Little
 Axle gage..... W. Angle
 Axle spindle cutter..... S. Davis
 Axle wrench..... G. P. Hall
 Bale of hay, &c..... G. A. Lowry
 Bales containing wool, &c. Fastening for hoops for securing..... G. R. Robertson
 Bales of fibrous or other materials, Forming..... G. A. Lowry
 Barker, Pneumatic..... C. R. Kline et al
 Barley bearder and cereal polisher..... M. Hansen
 Bearing, Ball..... F. Hansen
 Bearing, Roller..... W. N. & W. N. Whitley, Jr
 Bed, Couch..... J. A. Hutchinson et al
 Bell, Alarm..... A. G. Nelson
 Bell, Door..... H. L. Washburn
 Belt, Electro medical..... S. J. Spalding
 Belts, Adjustable coupling for sewing machine or other round, 2 pats. D. H. Abney
 Bicycle handle bar..... W. N. & W. N. Whitley, Jr
 Bicycle luggage carrier..... A. G. Jackson
 Bicycle propulsion..... W. T. Johnson
 Binder..... H. E. Dade
 Bird reel, Folding..... H. W. Glascock
 Bleaching keir..... J. C. Toms
 Boiler fuel controller, Steam..... H. K. Clover
 Bolt..... A. Hayes
 Bookbinding..... J. F. Swanney
 Bottle, Non refillable..... A. C. C. Liardet
 Bottle stopper..... J. A. Moller, Jr
 Box making machine, Automatic..... J. H. Clark et al
 Brake..... J. D. Edwards
 Brake shoe..... C. J. Gulden
 Brick mold..... J. Creager
 Bridge, Suspension..... N. H. Sturgis
 Buggy step..... J. G. Rehkopf
 Building support..... M. H. Callahan

- Bustle and hip extension..... W. E. Wetherell
 Button, Metallic garment..... G. J. Capewell
 Button hole cutter..... P. Olsen
 Cabinet, Cartoe spice..... A. N. Warren
 Calendaring machine..... M. S. Whitlock
 Can loading device, Milk..... F. E. Tichenor
 Can opener..... P. F. Law
 Can or bottle opener..... B. R. Bacon
 Canopy for tricycles, &c..... B. J. Olding
 Car brake, Street..... R. Bischoff
 Car coupling..... C. A. McKarahan
 Car door, Grain..... J. Fleisher
 Car draft rigging, Railway..... D. C. Ross
 Car, Dumping..... J. D. Shanahan
 Car fender..... W. F. Weiss
 Car record device..... J. R. Cavanagh, et al
 Car seat..... H. S. Hale
 Car spring, Pneumatic..... P. Herpolsheimer
 Car step, Folding..... A. D. Coon
 Cars, Compensating gear wheel for motor..... G. Burger
 Cars on overhead electric railways, Means for regulating speed of..... H. M. Harding
 Caramel cutting and wrapping machine..... H. Y. Armstrong
 Carbureter..... F. L. Martenette
 Card clothing..... L. C. Schneider
 Card punching machine, Jacquard..... V. Royle
 Carpet, Woven pile..... W. Benham
 Cartridge shell..... G. Lammadin et al
 Cash box..... W. Knehans et al
 Cask handling device..... F. L. Lumbert
 Checkrein holder..... W. Gates
 Checkrein hook..... G. W. Begole
 Chuck, Magnetic..... O. S. Walker
 Chuck, Rock drill..... W. Terry
 Churn..... J. S. Fitzhugh
 Cigar holder..... L. Muller
 Clevis..... B. Gotter
 Clock..... G. W. Adams
 Clock, Electric..... F. Frick
 Clutch for driving machinery..... J. W. Fries
 Clutch, Friction..... J. A. Smith
 Coasting and brake mechanism..... G. J. Gastonguay
 Coherer..... H. Shoemaker
 Coin card or mailer..... L. R. Lindley
 Coin controlled apparatus..... J. H. Champ
 Collar..... S. W. Woodbury
 Collating machine..... T. C. Dexter
 Color holder..... S. A. White
 Comb..... E. B. Kingman
 Comb and brush, Combined..... E. T. Robinson
 Commutator, Electrical..... E. Batault
 Commutator forming apparatus..... A. F. Petch
 Compasses, Beam..... G. Tucker
 Condenser or exhaust tube for steam engines..... A. P. & H. Smith
 Controlling device..... W. H. Paine
 Conveying apparatus..... T. S. Miller
 Cooling coil and tank..... J. Levey
 Cooling or refrigerating apparatus..... G. Allegretti
 Cord or rope making machine..... T. W. Norman
 Corn drill and manure distributor, Combined..... C. M. Wells
 Corn husker..... W. H. Stoner
 Cotton, Machine for handling lint..... P. Kolb
 Culvert, Metallic..... C. Wolcott et al
 Curb and gutter, Combined..... S. B. Morss
 Curling tongs, &c. Heater for, W. H. Stimpson
 Current motor, Alternating..... D. E. Coulson
 Curtain fixture..... C. A. Obenchain
 Cutter head..... S. M. Langston
 Cutting machine..... O. Zucker
 Cycle..... A. Sharp
 Cycle, Water..... S. R. Perry
 Damper..... J. W. Anderson
 Dental engine handpiece..... F. W. Dean
 Dental instrument..... W. E. Harper
 Directory or indicator for offices, Registering..... E. & F. E. Walker
 Display cabinet..... A. M. Owens
 Door bolt..... F. Pilling
 Door fastener, Screen..... W. B. Cochran
 Douche bench..... T. F. McCullough
 Dough for bread, Making..... W. S. & C. I. Corby
 Draft equalizer..... G. A. F. Labudde, Jr
 Draft rigging..... L. A. Hoerr
 Draw bar and coupler..... J. E. Liddle
 Draw bar mounting device..... A. Kipp
 Dredger excavating mechanism..... R. H. Postlethwaite
 Dressing, Bar..... A. L. Eaton
 Dust pan and broom holder, Combined..... J. H. Ormsby
 Dye and making same, Black sulfur..... J. Abel et al
 Eaves trough..... J. C. Carr
 Educational appliance..... C. Koishorn
 Electric carriers, Reversing device for over..... A. S. Clift
 Electric conductor and resistance support..... H. W. Leonard
 Electric controller..... W. B. Potter
 Electric switch..... E. M. Hewett
 Electric switch, Automatic..... C. F. Butte
 Electrical machines, Winding for..... B. G. Lamme
 Electrical switch..... C. J. Kintner
 Electromotive force, Regulator of rotary converter..... B. G. Lamme
 Elevator for granular substances..... P. Bedarides
 Elevator or hoist controlling apparatus..... A. Smith
 Engine muffler, Explosive..... C. F. Weeber
 Engine muffler, Gasoline..... G. Reenstierna
 Engines, Automatic regulator for marine..... D. Mahoney
 Entasisograph..... G. Kimbrell
 Envelop gumming and folding machine..... T. B. Kendell
 Envelop machine..... E. Ermold
 Envelop pocket attachment..... G. P. Herndon
 Expansion bolt..... S. Wheeler
 Explosive engine..... W. J. Pugh
 Explosive engine, Free piston..... W. A. Swan
 Eyeglass frame..... F. Weidenfeld
 Eyeglasses..... L. M. Phillips
 Eyelet..... R. L. Ellery
 Fabric..... J. Philipps et al
 Fare register..... V. Weber
 Faucet for syrup bottles, Registering..... F. E. Thompson et al
 Faucet, Self-closing..... J. W. Lyon
 Feeding and cleaning attachment, Boiler..... C. Reiser
 Fender..... R. Smith et al
 Fiber, Machine for making wood..... G. E. Le Clair
 File, Newspaper..... W. L. Lambkin
 Filter, Oil..... H. B. Wyman
 Fire escape..... T. G. Joyce
 Fire escape..... H. Behrens
 Fire escape..... F. Barclay
 Fire extinguisher, Automatic..... F. Grinnell
 Fire extinguishing apparatus..... M. H. Hart
 Fireproof shutter..... J. E. Guild
 Fireproofing wood..... K. Rucker
 Fires, Cellar pipe for extinguishing..... M. H. Hart
 Fish handling, draining, and displaying device..... E. H. Snyder
 Fish trap..... E. W. Livermore
 Floats for steam or water traps, Forming..... W. F. Patton
 Flue for conducting fumes..... C. M. Johnson
 Flushing tank handle or pull..... O. Brenz
 Foldable box..... C. B. Proctor
 Foot guard..... E. Truxall
 Foot rest..... F. G. Smedley
 Furnace fuel feeder, reissue..... F. N. Spear
 Furnace fuel feeding attachment..... W. G. Stones
 Furniture joint, Knockdown or separable..... F. L. Forster
 Garment hanger..... M. H. Bushnell et al
 Garment stretcher..... H. Anderson
 Garment supporter clasp..... J. B. Mahana et al
 Gas detector..... O. Freymann et al
 Gas generator, Acetylene..... K. G. Gustafsson
 Gas generator, Acetylene..... E. Bjornrud
 Gas generator, Acetylene..... A. Myers
 Gas generator, Acetylene..... H. L. Salisbury
 Gas or vapor burner or stove, Hydrocarbon..... D. W. Bowman et al
 Gas retort stopper, Inclined..... A. F. P. Hayman
 Gas separator for digesters..... C. W. Mills
 Gas valve, Automatic..... C. Koshalko
 Gas valve, Automatic safety..... J. M. Wescott et al
 Gear, Continuously variable speed..... A. Sharp
 Gear cutter..... E. G. Ashley
 Gearing, Reversible variable speed..... G. F. Conner
 Glass mold locking device..... A. Strub
 Glove cleaner and making same, Kid..... H. Gottschalk
 Gong..... A. F. Kleinschmidt
 Governor, Gas engine..... A. Sonander
 Grain separator..... W. J. Kerr
 Grapple..... M. H. Callahan
 Gun mount..... S. N. McClean
 Gun recoil check..... S. N. McClean
 Hair drying apparatus..... A. Bausen
 Hancock..... F. A. Headson
 Hand propelled chair..... N. A. Sawyer
 Harrow, cultivator and plow, Combined..... A. L. Blackwell
 Harvester..... E. Dominy
 Harvester, Corn..... C. Colahan
 Harvester, Corn..... A. V. Kiser
 Harvester, Cotton..... P. P. & P. F. Haerti
 Hatch cover..... W. W. Dawley
 Head rest..... W. N. Greer et al
 Heater, cooler, and storage basket, Combined..... N. N. Boniface
 Heating and ventilating apparatus..... J. M. Miller
 Heating granular substances, Apparatus for..... C. Greene et al
 Heel, Boot or shoe..... T. H. Mayo
 Heel, Detachable shoe..... V. A. Fabrycki
 Heels for boots or shoes, Detachable..... M. L. Hansen
 Hinge..... F. L. Barnick
 Hinge, Leaf..... W. M. Gamble
 Hinge, Spring..... M. C. Bersted
 Hoop tightening device..... C. Hummel
 Hose nozzle sprinkling attachment..... G. L. Gay
 Hydrogen dioxide, Making..... P. L. Hulin
 Ice cream freezer..... E. R. Morse
 Identifying device..... I. L. Wilber
 Incandescent mantles, Means for transporting..... J. F. Bredow
 Incubator..... V. S. Bell
 Indented and perforated material..... H. Parker
 Indicator..... R. A. Wood
 Ingot heating furnace..... V. E. Edwards et al
 Insect destroyer..... D. J. Manning
 Insect powder, Device for smokelessly heating..... J. C. Searle
 Insecticide distributor..... A. S. Lee
 Insulating and packing material and manufacture same..... M. Raphael et al
 Insulating covering material for electric cables, conductors, &c. 2 pats..... G. E. Heyl-Dia
 Insulation..... W. S. Moody
 Ironing machine..... W. H. Dunn et al
 Kettle or dish scraper or cleaner..... W. S. Palmer
 Key holder..... C. J. Schumacher
 Kite, Musical..... H. R. Saunders
 Knife..... E. Hemstrom
 Knit goods, Machine for unraveling..... L. A. Desy
 Knitting machine..... C. J. Appleton
 Labelling machine..... E. N. Gillilan et al
 Lacer, Shoe..... W. Freck
 Ladder, Aerial..... 2 pats..... F. S. Seagrave
 Ladder and escape, Fire..... P. Bastianello
 Lamp burner..... G. A. Smith
 Lamp burner, Oil..... F. T. Williams
 Lamp, Electric arc..... H. C. Spinney
 Lamp, Electric arc..... H. Etheridge
 Lamp, Street..... F. A. R. Adam
 Lamps, Automatic lighter or extinguisher for gas..... N. H. Shaw
 Lathe attachment for cutting spirals..... E. Rivett
 Level, Spirit..... J. R. Wood
 Level, Spirit..... C. F. Nicky
 Linotype or other metal casting machines, Adjustable mold for..... M. P. Freeby
 Liquid cooling device..... B. W. Mason
 Liquid heating furnace..... D. Laird
 Lock and latch, Combined..... M. C. Patrick
 Lock or clutch for sectional cases..... F. L. Forster
 Locking mechanism for safes or vaults..... H. D. Hibbard
 Loom filling carrier..... H. W. Smith
 Loom, Swivel..... R. Atherton
 Loom, Temple..... E. S. Stimpson
 Loom, Weft replenishing..... H. I. Harriman
 Looms, Electric circuit closer for..... H. W. Smith
 Lubricating apparatus..... H. Hamelle
 Lubricating steam turbines, &c..... J. McCaffrey
 Mail box..... A. C. E. Rateau et al
 Mail marking machine..... A. M. Burnham
 Mast or flagstaff truck..... S. H. M. Seib
 Match making machine..... E. H. Eisenhart
 Matrix..... J. L. Winter
 Medicine carrier..... J. Schaffer
 Metal pigs from their molds, Means for ejecting..... E. E. Slick
 Metals from sulfid ores by treatment with chlorid or sulfur and electrolysis, Extraction of..... J. Swinburne et al
 Milk can..... C. J. Nordin
 Mine timber..... D. W. Burton
 Music roller actuating mechanism..... F. Engelhardt
 Musical instrument, Automatic..... J. McTammany
 Musical instrument, Mechanical..... J. McTammany
 Necktie fastener..... E. Kiene
 Nitrocellulose..... D. Bachrach
 Numbering machine..... J. H. Reinhardt
 Nut lock..... reissue..... M. Bartley
 Oar, Bow facing..... G. F. Sprague
 Oil can..... J. Swisher
 Oil cup, Crank pin..... W. G. Montgomery
 Oils, Refining..... F. Linde
 Ore roaster, Gravimetric..... J. A. Odgen
 Ore separator..... J. J. Snider
 Ores, Separating..... G. Frolich et al
 Organs, Apparatus for controlling the wind supply and pressure in..... J. R. C. Gale
 Packing device, Piston rod..... T. G. Saxton
 Packing granular material, Mechanism for..... E. L. Bracy
 Packing, Rod..... T. H. Butler et al
 Painting machine, Can..... A. T. Shortley et al
 Paper bag machine..... G. C. Nelson
 Paper box, Knockdown..... I. H. Rice
 Paper folding machine..... H. H. Cummings
 Paper pulp discharge valve..... H. Schaaf
 Paper, Water and grease proof..... A. D. Little
 Paper, Waxed..... A. D. Little
 Paste bucket and stand therefor..... E. L. Bailey
 Peg cutter..... E. S. Wahman et al
 Pen, Fountain..... W. W. Sanford
 Pen, Fountain..... L. M. Bryan
 Pen, Safety fountain..... E. Gilbert
 Phonograph or graphophone record cylinders, Carrier or holder for..... C. J. Kintner
 Pipe wrench..... F. I. Webber
 Plant thinner..... A. Espinosa
 Planter furrow opener..... J. L. Ashurst
 Planter, Hand..... J. V. Teel
 Plates or tiles, Manufacturing..... F. Gehre
 Plow..... F. L. Ezell
 Plow, Disk..... A. S. Bailey
 Pneumatic despatch tube system..... E. A. Fordyce
 Pneumatic motor..... C. L. Davis
 Pneumatic motor..... C. R. Kline et al
 Pneumatic switch and signal..... J. W. Keeney
 Pocket book protector..... A. J. Martin
 Pocket knife..... J. B. Upham
 Poke, Animal..... C. W. Ford
 Polishing tool, Pneumatic..... J. W. Birkhenstock
 Potato lifter..... J. T. Craig
 Poultry, Device for drawing tendons from the legs of..... B. W. Small
 Powder, Gun..... F. W. Jones
 Powder, Semismokeless..... P. C. Stire
 Powder, Treating gun..... F. W. Jones
 Power transmitting device..... R. B. Mann
 Printer's chase, Separable or sectional..... W. H. Padgett, Jr
 Printer's quoin..... W. H. Lynchard
 Printing press attachment..... R. Naumann
 Printing press perforating attachment..... A. O. Hayes et al
 Printing press sheeting attachment..... M. A. Droitcour et al
 Printing press tinting and delivery attachment..... A. J. Hood
 Propeller, Screw..... F. C. Metz
 Propulsion, Marine..... I. M. Chase
 Protractor, Navigating..... C. M. McCormick
 Pruning shears..... C. W. Reed et al
 Pulley, Expandable..... R. Temple
 Pulley, Sheet metal..... C. H. Bicalky
 Pulp into sheets, Forming wood..... J. S. Hughes
 Pulp press, Wood..... J. S. Hughes
 Pump operating mechanism..... J. B. Miller
 Punch, Cold iron..... J. C. Burgess
 Punching machine..... F. F. Cumms
 Racking apparatus, Carbonated beverage..... H. A. White
 Radiator attachment..... G. W. Nistle
 Rail joint, Detachable key..... A. Kreps
 Railway gate..... G. S. & W. D. Sumlin
 Railway rail..... G. A. Case
 Railway switch..... C. A. Egger
 Railway switches, Mechanism for automatically operating..... C. J. Kintner
 Railway system, Electric..... W. B. Potter
 Railway tie plate..... R. L. Underwood et al
 Railways, Collector for surface contact..... W. R. Potter
 Range indicator..... A. Le Blac
 Reach coupling..... T. G. Mandt
 Registering apparatus, Autographic..... J. S. Ferguson
 Reins, &c. Handle for driving..... W. B. Snyder
 Roaster and trusser..... W. C. Williamson
 Roasting furnace..... W. A. Lorenz
 Roll polishing apparatus..... D. R. Ferguson et al
 Rolling mill attachment..... J. R. George et al
 Roofing material, Chemical..... J. M. Wright
 Rope making machine..... T. W. Norman
 Rotary cutter..... H. A. Hannum
 Rotary engine..... G. F. Sage
 Sash fastener..... E. A. Bronson
 Sash fastener..... C. M. Zirkle
 Sash fastener, Storm..... C. Mandlin
 Sash supporter..... E. A. Bronson
 Saw sharpener..... N. Kall
 Scale..... J. S. Cortelyou
 Seat..... F. H. Janson
 Separator..... 2 pats..... C. H. Scott
 Sewing and cutting machine, Buttonhole..... F. W. Ostrom
 Sewing looped fabrics, Machine for..... G. Keyser
 Sewing machine, Buttonhole..... F. W. Ostrom
 Sewing machine hemmer..... A. H. Devoe
 Sewing machine work gage..... H. A. Klemm
 Shade and curtain bracket, Window..... T. H. Kenvin
 Shaft attachment, Vehicle..... D. J. Jones
 Sheaf fork..... G. Hall et al
 Shipper mechanism..... J. McCaffrey
 Silo..... J. W. Smith
 Skewer making machine..... A. T. True
 Snap switch..... A. Sundh
 Spark arrester..... G. F. Moore, Jr
 Speed changing and reversing mechanism..... W. P. Norton
 Pinning and doubling machinery, Cop-building mechanism for..... T. Watson
 Spinning machinery drag device..... T. Watson
 Spoke and felly fastener..... J. S. Davis
 Spoke throating machine..... C. Seymour
 Spring attachment for articles of wear, &c..... 3 pats..... P. E. Writ
 Steam boiler..... B. A. Keeler et al
 Steam boiler..... J. H. McDonald et al
 Steam engine, Compound..... 2 pats..... J. E. Sague
 Steam generator..... 2 pats..... G. H. Rheutan
 Steaming fabrics, &c. Apparatus for..... T. Walsh
 Stereotype matrices with musical notes, &c. Apparatus for impressing..... A. Revelle
 Stitch separating machine..... J. B. Hadaway
 Stoker, Mechanical..... T. N. Harrison
 Stool, Bookkeeper's..... S. S. Bryan
 Sugar, Dissolving low grade..... M. Lambert
 Sugar washing machine..... L. Fuchs
 Sulfuric anhydrid, Apparatus for making..... R. Kuetsch
 Surface checking device..... T. C. Page
 Suspensory..... J. U. Adams
 Switch controller, Automatic..... W. A. N. Dorland
 Switch, outlet, and receptacle box..... M. Robinson
 Synchronizing alternators..... J. E. Woodbridge
 Tailings, Apparatus for handling..... H. W. Blaisdell
 Tar, &c. Production of solid materials from..... C. Dorr
 Telephone lines, Switching mechanism for interconnecting..... A. K. Andriano
 Telephone switchboards, Self ejecting plug for..... C. F. Butte
 Thill coupling..... W. L. Bodman
 Thresher tank..... E. E. Stutz
 Threshing machine tooth..... G. F. Conner
 Tile faced surface and constructing same..... W. P. Meeker
 Tire inflater..... 2 pats..... J. H. Champ
 Tire, Rubber..... A. S. Krotz
 Tool holding device..... L. S. Starret
 Trace holder and protector, Combined..... J. M. Whyte
 Track sanding device..... J. A. Waters
 Traveler's lock..... H. Spear
 Trolley and track wires for suspended cable roads, Support for..... H. M. Harding
 Trolley systems, Electric signal mechanism for overhead..... W. R. Stearns
 Tumbling box..... W. F. Patton
 Twine reel..... J. H. Holbrook
 Type writer ribbon feed mechanism..... W. J. Kauffman
 Type writer tabulating scale..... C. L. Dahlberg
 Type writing machine, 2 pats..... W. J. Kauffman
 Unloading apparatus..... M. Parker
 Upholstery apparatus..... A. Freschl
 Valve gear, Engine slide..... S. S. Younghusband
 Valve lock..... L. Toback
 Valve mechanism, Reversing..... C. S. Leonard
 Valve, Reversing..... C. R. Kline et al
 Vaporizer..... F. Jacobson
 Vaporizing system, Fluid..... R. O. Hood
 Vault, Portable burial..... G. B. Okey
 Vehicle frame..... J. Wilkinson
 Vehicle frame, Motor..... R. O. Hood
 Vehicle, Motor..... J. F. MuNutt
 Vehicle seat..... O. F. Personn
 Vehicle seat..... J. B. Connor
 Vehicle truss rod spring..... T. G. Mandt
 Vehicle wheel..... G. S. Turner
 Velocipede, Winter..... B. C. Trudelle
 Vessel handle..... A. R. Pritchard
 Vessels, Apparatus for raising sunken..... J. Barker
 Wagon brake..... T. Callister
 Wagon for delivering fermented liquids, Tank..... V. Spietschka
 Washing machine..... C. A. Coffin
 Washing machine..... C. P. Steinmetz
 Water closet..... W. E. Hinsdale
 Water meter..... D. V. Hallberg
 Water purifier..... C. H. Snyder
 Weather strip..... P. D. Jones
 Weather strip..... J. Cook
 Well screen..... F. I. Webber
 Wheel..... O. Congellton
 Whiffletree construction..... C. E. Dupont et al
 Wind instrument..... J. P. Koch
 Windmill regulator..... G. S. Long
 Window..... J. Lyes
 Window frame..... F. N. Boyce
 Window, panel, or other sliding frame..... J. Thorpe
 Wire cutting die..... R. A. Breul
 Wire stretcher..... S. H. Dunlap
 Wrench..... R. B. Blackburn
 Zein, Extracting..... T. B. Osborne et al
 Zinc from sulfid ores, Recovering..... H. F. Kirpatrick-Picard

DESIGNS.

- Alphabet..... 3 designs..... M. T. Goldsmith
 Box blank, Paper..... F. A. Stretcher
 Brake rod end..... J. H. Baker
 Brush or mirror back..... W. W. Bromham
 Brushes, &c. Back for..... L. B. Prahar
 Carpet..... J. S. Vredenburg
 Dental instrument holder..... J. B. Vernon
 Dial..... A. Friedman
 Drawer, Cabinet..... T. Kundtz
 Electric machine casing, Dynamo..... V. G. Apple
 Engine frame or casing..... R. E. Hardy
 Eye for garment fasteners..... R. D. Richardson
 Eye for garment fasteners..... G. H. Cliff
 Eye for garment fasteners..... F. E. De Long
 Firearm cylinder cover..... F. I. Johnson
 Flower stand..... C. W. Lind et al
 Garment supporter..... 2 designs..... F. G. Dietz
 Hook, Garment..... C. Leib
 Horseshoe pad..... J. A. Buck et al
 Ice cutters and ice cream freezers, Supporting frame for..... C. A. & M. Calteson
 Jar clamp, Fruit..... L. A. Climer
 Knife, Melon and pie..... C. H. Hahn
 Pipe coupling clamping ring..... S. R. Dresser
 Pipe, Tobacco..... H. W. Comstock
 Radiator top..... G. Beck
 Reflector for artificial lights..... O. A. Bennett
 Rug..... 2 designs..... E. H. Bennett

Rug.....2 designs.....A. Petzold
Sewing machine cabinet, 2 designs, T. Kundtz
Sole. Shoe.....J. S. Busky
Spoons, &c. Handle for.....J. M. Bracken
Stove. Gas heating.....J. A. Whitman
Switch contact member.....G. W. Hart
Urinal.....C. Desormoux

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MECHANICAL PATENTS.

Acidyl derivative of unsymmetrical acetonal-
kamins and making same.....C. Harries
Advertising purposes. Moving model for.....
E. J. Bourke
Aerated liquids on draft. Apparatus for sup-
plying.....S. A. Jackson et al
Air compressing apparatus.....J. H. Burdick
Air exhausting apparatus.....H. F. Wallmann
Amalgamator.....J. W. R. Laxton
Annunciator.....J. A. Wotton
Annunciator. Electric.....E. B. Overshiner
Anticribbing device.....M. M. Millis
Atomizer.....2 pats.....C. J. Seltzer
Atomizer and nebulizer. Combined.....
C. J. Seltzer
Baby jumper.....J. H. Crutchfield
Bag making machine.....D. J. Mullen
Bags, papers, &c. Machine for forming knotted
loops on.....W. Busch
Baking pan.....J. H. Jones
Baking powder.....3 pats.....J. A. Just
Bandage case. Reversible.....S. Bottomley
Bar fixture.....W. E. Poate
Bars, &c. with a covering of extruded material.
Apparatus for providing.....D. J. Jarvis, et al
Barrel tilting holder.....J. Elliott
Bed canopy.....V. M. Brown
Beehive wintering case.....M. Hemple
Bicycle.....P. & M. Tarzian
Bicycle attachment.....H. Simmons
Bicycle lock.....W. H. Niemeyer
Binder. Temporary.....C. K. & C. A. Reed
Binding. Metal ring for temporary.....
H. T. Adams et al
Blackboard.....J. K. Ritchey
Blind fastener.....L. B. Gaylor
Blow pipe torch.....C. G. Woodmansee
Boats on ships, &c. Means for disengaging
and replacing the supports of.....T. Wilson
Boiler cleaner.....D. N. Baxter
Bolt cutting machine.....A. W. Epright
Book. Deposit credit.....T. D. Taylor
Book for drapers, tailors, or others. Manifold
counter check or sales.....J. S. Holmes
Bottle.....A. Maake
Bottle covers. Machine for making straw.....
M. van den Heuvel
Bottle. Mucilage.....J. C. Carpenter
Bottle. Non refillable.....E. Johnson et al
Bottle. Non refillable.....C. Carr
Bottle. Non refillable.....E. T. Evans
Bottle stopper.....G. Rouse
Bottle stopper fastener.....H. Pennie
Box.....A. Flakamp
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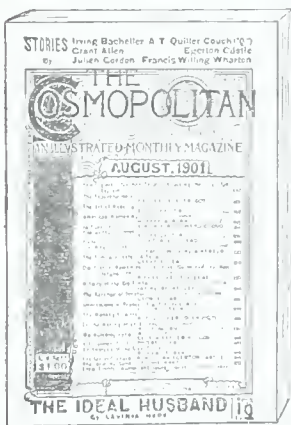
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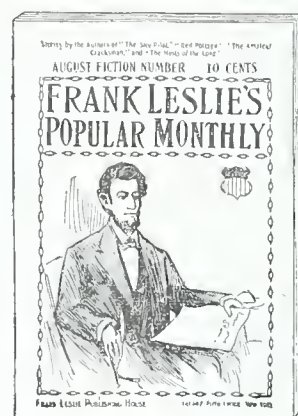
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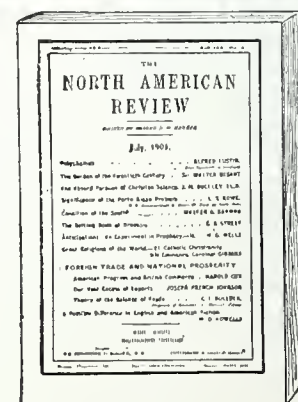
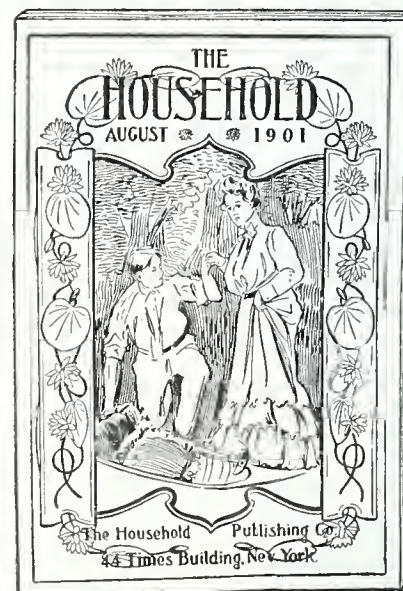
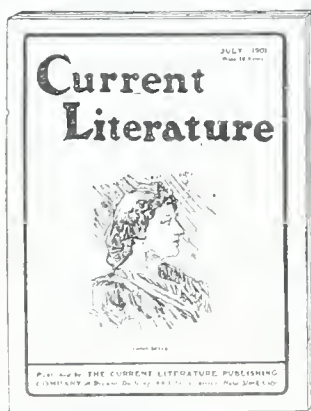
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THE SUGAR INDUSTRY - - OF CUBA. - -

THE discussion in Congress and in the press of the proposed tariff concessions to Cuba, more particularly for sugar, makes opportune a brief description of this industry in the Pearl of the Antilles.

The raising of sugar cane has for many years been the mainstay of the island. The Cuban sugar lands are all upland soils, quite different from the lowlands of Louisiana, and excel in fertility those of all the other West Indies. The cane requires to be planted only once in seven years, instead of every year, as in some places. No fertilizers are used. The sugar plantations vary in extent from 100 to 1,000 acres, and employ an average of one man to every two acres.

Before the outbreak of the Revolution, these estates were models of scientific cultivation. The machinery was the best obtainable. The quarters for the laborers were neatly built, and hospitals were provided, fountains for bathing, and establishments where children were cared for while their mothers worked in the fields. The great *centrals*, or grinding plants, were enormous buildings, and some of them had over forty miles of private railway leading from the fields to the mills. During the war, this industry was almost entirely destroyed, though it now shows signs of reviving.

In 1892-93, Cuba produced about 1,000,000 tons of sugar, breaking its record up to that time; it has not since equaled this quantity; the disasters of war reduced its crop to not quite 300,000 tons, but it has risen in spite of financial difficulties to over 800,000

tons within the last two years, and at the end of the next season it is believed it will again amount to 1,000,000 tons, or nearly half of the total quantity of sugar consumed in the United States yearly. This crop, too, is capable of indefinite enlargement. Only one-fourteenth part of the area of the island is under cultivation for cane, and when it is considered that other sections are equally well adapted to it, it is clear that Cuba can easily be made the greatest sugar producing country in the world. As it is, it surpasses in output (taking the crop for a normal year as a basis of estimate) all the great sugar producing countries of Europe save one, in spite of their elaborate systems of bounties. It produces twice as much cane sugar as Java (the next largest cane producing country,) and among the beet sugar countries it is exceeded only by Germany, which produces about 2,000,000 tons. The crops in Cuba vary from 12 to 50 tons per acre, and the percentage of sugar is greater than that of any other American country, except Mexico.

The recovery in sugar raising in Cuba since the war, appears to have been realized in the restoration of fields rather than in the rebuilding of plants. A properly equipped *central* today involves an expenditure of perhaps \$1,000,000,

and in the present uncertainty as to future tariffs, capital shrinks from such investments. The chief obstacle, however, to the future of the Cuban sugar industry, and an obstacle which has hindered its natural prosperity for many years—is the competition of bounty-fed beet sugar, which has shut it out of European markets, including England. Cuba consumes only about 50,000 tons a year of its product, and nearly all the remainder finds an outlet in this country. Hence the anxiety in Cuba for a reduction of the duties imposed here.

Imports of sugar into the United States last year amounted to 4,670,000,000 pounds, and cost about \$115,000,000. These figures exceeded those for any previous year, and showed an increase in this line of 30 per cent in the last ten years, or about one billion pounds. It is easier to grasp the meaning



LOADING VESSELS WITH SUGAR AT HAVANA.

of these statistics by more familiar measurements. Accepting the average car load at 60,000 pounds, the sugar importations of 1901 would be enough to load 78,000 cars. In addition to this enormous quantity, the sugar production in this country was about 600,000,000 pounds. Fully 85 per cent of the importations consisted of cane sugar, and 30 per cent came from Cuba. Hawaii supplied 300,000,000 pounds, valued at \$12,000,000. Beet sugar was imported to the extent of over half a million pounds, mostly from Germany and Austria. The United States consumes more sugar than any other nation, or approximately one quarter of the world's product. The world's production and consumption of sugar is now about 8,250,000 tons per annum, two-thirds of which is produced from beet and only one-third from cane. The production of beet sugar in the United States is rapidly increasing. There are four factories in Illinois, three in Nebraska, three in Colorado, two in California, and several in Minnesota, etc. At Sugar City, Colorado, a farm of 12,000 acres has been devoted to raising beets, and a sugar factory has been built with a capacity of 500 tons every twenty-four hours. On this farm, 1,000 men and women are employed during the summer. The output is increasing, and there is a growing demand for workmen. The Arkansas Valley, in Colorado, is said to yield perhaps the best results, in percentage of sugar, thanks to its equable climate, ample supply of water for irrigation, cheap fuel and limestone, and unlimited extent of land available for culture.

Naturally, these thriving home industries oppose the reduction of the tariff on Cuban sugar, on the ground that it would work serious injury to them; but the fact remains that this is practically the only foreign market for the product of the island, and unless some rebate is granted, it will mean ruin to the interests there, and economic stagnation. A solution of the problem is yet to be reached.

The accompanying illustration shows one of the wharves at Havana, where sugar is being loaded for shipment to the United States.

New Molding Clay.

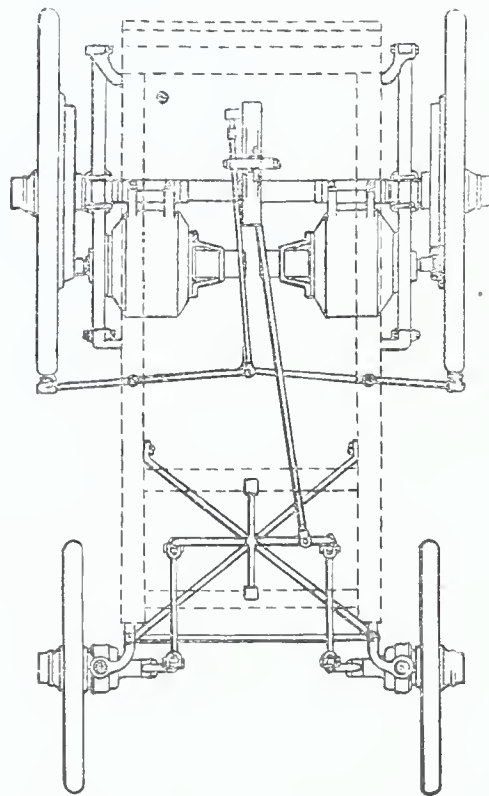
Trials have been repeatedly made to replace the molding clay now in use, by a substance which would preserve its plastic quality without there being a necessity of keeping it continuously damp or moist, as is the case with the material now employed.

Several preparations of this kind are now offered for sale. They are not only very expensive, but also deficient in one way or another. Experiments have been made in adding to the molding clay some substance that would keep it damp and at the same time plastic. Grease and oil, glycerine, and similar materials, which either do not dry at all or very slowly, can be mixed with clay easily enough, but they do not impart to it any durable plasticity, as in the course of time all these greasy additions decompose and render the material treated altogether useless. A new process, which is said to successfully cope with this question, has been patented in Germany. The clay is mixed in the usual way with turpentine, glycerine or similar substances, and then vaseline or petroleum refuse (containing much vaseline) is added. The quantity of vaseline to be mixed with the clay depends upon the degree of softness which the clay is desired to have, varying from 10 to 50 degrees. By the use of various kinds of clay and by certain changes in the ingredients added to it, the color and plastic quality of the new molding clay can be regulated to suit the purpose of the manufacturer.

IMPORTANT COURT DECISION ON AUTOMOBILE PATENT.

During these days of automobiles, great strides are being made and important improvements devised in their construction, with the result of numerous patents being issued upon the same. The value of patenting these improvements is well evidenced by a decision recently handed down by the United States Circuit Court for the Southern District of New York.

The facts briefly stated are these: ever since inventors have been working upon self-propelling vehicles, the question of electrical propulsion has, of course, been one of the important points to attract their attention. The earlier vehicles employed a single motor, which had to be connected to both of a pair of wheels so as to drive them uniformly, and yet permit their relative independent movement in turning corners. The whole line of inventions had practically dropped into a rut, namely, the improvements on the means for connecting this single motor to the wheels. There were various difficulties to be overcome, as for instance, flexible supports for the motor which would permit the



vehicle being run over rough roads without affecting the proper operation of the same. Then again, it was necessary to divide the rear axle and connect it by compensating gearing. This greatly weakened the structure, and other means had to be devised for supplying sufficient strength. Furthermore, the motor could be run only at high speeds, and it was necessary to employ suitable gearing which would drive the vehicle wheels at a relatively low speed.

In 1897, two gentlemen, who reside in Philadelphia, Pa., Messrs. Henry G. Morris, and Pedro C. Salom, patented an arrangement which obviated all the above difficulties, and was so simple that it seems strange that the many inventors who had been working in this art had never hit upon it before. The idea was to provide a rigid axle, as in an ordinary vehicle,

and to loosely mount the two driving wheels on the ends of the same. A separate motor was provided for each wheel, and was mounted on the axle so as to be in alignment at all times therewith. Each motor had a short shaft that projected from the casing and was provided with a small pinion which meshed with a large gear wheel, mounted upon the loosely journaled driving wheels. The electrical connections were made in the usual manner. The general plan and simplicity of the invention will be readily seen by reference to the accompanying illustration in connection with the following claim which was allowed to the patentees:

The combination in an electrically-propelled vehicle, of the body, a rigid axle, two driving-wheels loosely mounted on said axle, two electric motors mounted on the axle side by side so as to align at all times with the axle, each motor having a short shaft, one shaft gearing with one driving-wheel and the other shaft gearing with the other driving-wheel so that the two driving-wheels are independently driven, substantially as described.

The arrangement apparently was so obvious, after it had been invented, that most of the companies constructing electrical vehicles evidently considered that no invention was involved therein, but realizing the advantages of the construction, they immediately appropriated the same without consulting the rights of the patentees. These gentlemen soon found a purchaser for their patent in the Electric Vehicle Company, which immediately took steps to protect the rights it had acquired. Fortunately, the claim of the patent was broad and fully covered the invention.

The first suit was instituted against Frederick R. Wood & Son, of New York, N. Y., and the Court unhesitatingly declared that the arrangement was a true invention, and that the patent was valid. The defendants were declared infringers and were enjoined from manufacturing or selling any more vehicles with this construction, an accounting of the profits being ordered.

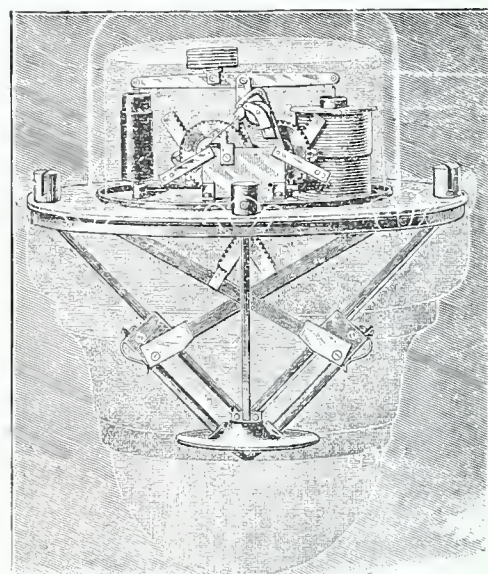
The wisdom of employing competent patent counsel in procuring the patent is shown in the outcome of this suit. If the patent had been carelessly drawn, the patentees might never have found a purchaser for their rights, and the whole field of two-motor construction would now be open to public use, instead of being the exclusive property of one company.

Upon a casual examination of the structure as shown, a person would ordinarily consider that very little invention was involved in supplying two motors in place of one, and using loosely journaled wheels as distinguished from wheels fixed to a revolving axle, and yet this is an example of what should be considered as the very highest type of invention, for the advantages accruing from this simple construction are of the greatest importance. It may well behoove a person, therefore, who has novel ideas in any line, which will make more practical or simple any machine or art, to carefully consider the same, as such ideas may be valuable to himself and to the world at large.

A New Arc Light.

A new electric arc light lamp with alternating current which is being manufactured at Budapest, is provided with an alternating current of 10 amperes at 28 to 30 volts, and is particularly remarkable for the peculiar position of the carbon rods. It is said to allow of an advantageous distribution of the light among the carbon rods.

The carbon rods are inclined towards each other at an angle of about 90 degrees, so that the greater part of the emitted rays of light fall downward, and those which have an upward tendency are turned downwards by means of a reflector which is installed just above the light. The diagram which shows the distribution of light by this kind of lamp indicates more favorable results than those of the arc lamps with alternating currents, now generally used. The new lamp is particularly useful for the purpose of throwing the light rays downwards, as little light is lost.



The regulating mechanism is very simple, and includes only two notched bars, one for each carbon rod. These notched bars are connected with a number of wheels and a system of levers to bring about a regular motion of the carbon rods. The whole mechanism is worked by the weight of the carbon rods and their holders.

The "Hackel-lamp" requires only from 28 to 30 volts, so that at a tension of from 100 to 105 volts, three such lamps can be put in a line.

It requires comparatively little space, makes no noise, and the simplicity of its mechanism avoids all irregularities which, for instance, may be caused by a deficient working of the chains. It goes without saying that these lamps cannot be used with direct currents.

Oiling Apparatus for Locomotives.

A Swedish invention which ought to have a good future is the system of oiling piston rods, cylinders, slide rods, and slide guides on locomotives, which has been invented by T. F. Malmros, of Gottenburg, locomotive engineer on the state railroads. Formerly, cylinders and slide guides have, at best, received necessary lubrication from the central steam-lubricated apparatus, but piston rods and slide rods with packings have been lubricated by means of old-fashioned oil cups with wick feed, which method, for many reasons, has proved unsatisfactory—especially when metal packings are used. Mr. Malmros, by introducing the inter-mixed oil and steam, coming from the central steam lubricating apparatus, through glander bushings expressly constructed for this purpose, has effected a good and economical lubrication of packings and rods, as well as of the cylinders and slide guides.

AMERICAN COAL HOISTER AT ALEXANDRIA.

THERE has been another trade invasion of Egypt by Americans, no less important than the securing of the Atbara bridge contract, which attracted so much attention on both sides of the Atlantic a few years ago.

The greatest work ever undertaken in Egypt in regard to discharging coal from steamers has just been completed in Alexandria. The huge mass of machinery that towers above the surrounding ships owes its origin to Mr. Alexander E. Brown, an American engineer, who has invented a system of suspended bridge tramways, whereby colliers could be unloaded automatically in about one-quarter of the time taken by manual labor and the use of steam winches. The Egyptian Railway Administration decided to adopt this system; the present apparatus is the first that has been installed in Africa.

The hoisters here are alleged to be capable of unloading 2,120 tons of coal in a working day of ten hours. A

the hold of a ship, put on the trolley, carried to the farther end of the bridge, discharged, and returned to the hold again in the space of one minute. The bridge is 27 feet clear at the lowest part, and the highest part is 72 feet. Each bridge is supported on a pier at the sea end and shear legs on the other side.

The pier allows room for two railway trucks beneath or inside. The bridges are divided into three sets of two in a set, one of which contains a boiler and two engines. These engines operate the trolley and raise and lower the buckets by wire ropes. The engines are of about twenty-five horse power. Steam is used instead of electricity, as it is more economical, the work not being continuous. Each bridge stands on three tracks, two under the pier and one under the shear legs, and each set of bridges may be moved the entire length of the quay independently, so as to be available in any one of the berths. The operation of each bridge is controlled by one man, and is effected by steam power from the same engine that works the bucket. Each bridge is hinged over the pier and pivoted on shear legs, so that it may be swung to a distance of

Centrifugal Gold Washer.

A novel machine for recovering gold and other precious metals from auriferous sands, clay, mud, and slime deposits has proved a success in operation at the works of L'Horme, near St. Etienne (Loire) France, where auriferous sands were treated and a saving of 98 to 99 per cent was effected with very little expense of water. The amount of gravel treated was 2 tons per hour, in a washer 8 inches in diameter.

This washer is essentially a centrifugal turbine revolving at a speed of from 400 to 600 revolutions a minute. At least 200 revolutions a minute are required for good work and a greater speed increases the production.

The apparatus is in the shape of a conical bucket, revolving round a vertical axle. The lower part of the cone, being the smaller, is completely closed, and the upper or larger part is not entirely open, but supports a flat, circular rim.

A funnel is placed around the axle, through which the water and material to be treated are fed, bringing the same to the bottom of the revolving centrifugal cone, before being affected by its momentum. As they reach the

The Cow Pea

"The Cow Pea" is the title of the latest publication issued by The Experimental Farm of the North Carolina State Horticultural Society, located at Southern Pines, N. C. This book, neatly bound and illustrated, discusses in a plain and concise manner the value and uses of this important plant, the cow pea.

The assertion that "what red clover is to the North and alfalfa to the west, the cow pea is to the South," was, a dozen years ago, strictly true; but to-day the cow pea has proved its worth and value far beyond its former home, and even in those sections of the country where red clover and alfalfa are grown as the principal forage or manurial crops.

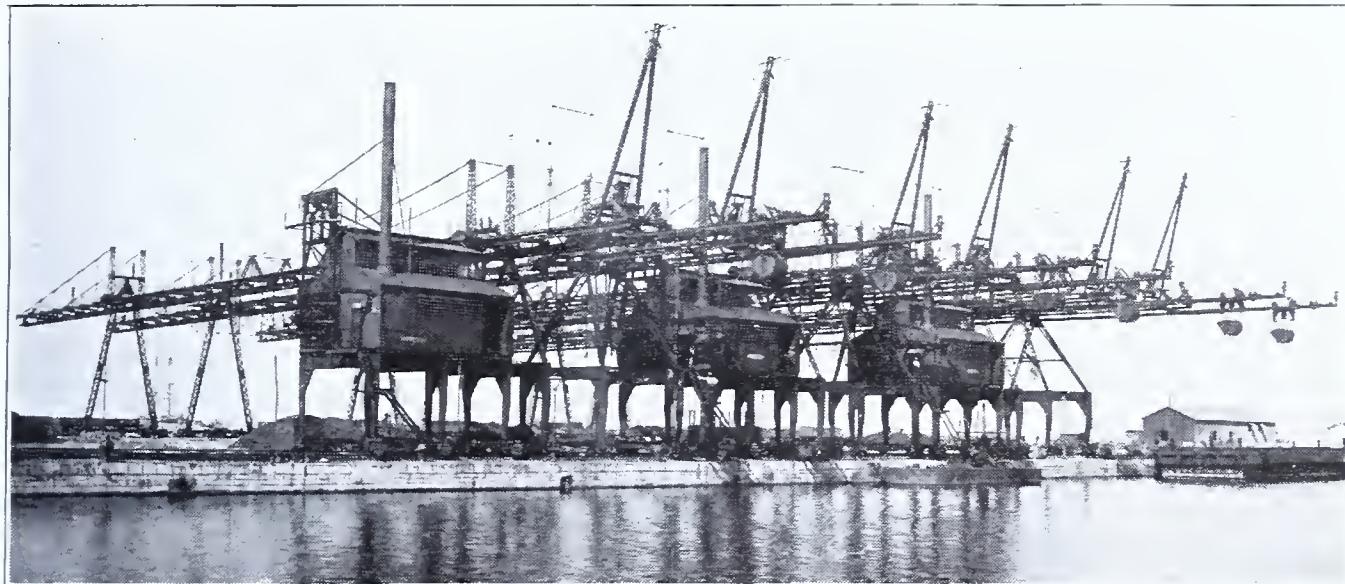
The aim in all plant growing is, as in all other business, to secure the largest possible money return, without diminishing the original capital. "How can the productiveness of land be increased?" is the question asked on every hand. The pamphlet answers that query by calling attention to the cow pea, a plant which, by its many valuable qualities, ease of cultivation over a wide territory, and cheapness of production, makes it a never-failing friend of the tiller of the soil.

As a clear, condensed synopsis of the history, habits, merits, and best manner of using the cow pea to the greatest advantage, the book will abundantly repay study and practical, every-day application.

Every reader can get a copy free by writing to the Superintendent of The Experimental Farm of the North Carolina State Horticultural Society, Southern Pines, N. C.

The Alloy Cycles.

Readers of the technical papers have no difficulty in tracing the course of the inventors so far as they are connected with the manufacture of certain alloys. Perhaps none have been so much discussed or so severely discounted as the copper hardening method. The inventor of the only genuine commercial method of hardening copper with and without alloys stands at the head of the list of inventors, numerically speaking. The present seems to be a particularly favorable period for bringing out the copper hardening processes. Several patents have been issued recently all possessing the merit of "newness" essential to cover a later method. In this age of rapid development and inventions it would be risking too much to say that anything mechanical is impossible. It may happen that some day the man may be found who will reach the point of success in the copper hardening process, but in the temper of the world the inventor will have his greatest difficulty in rounding it into a commercial possibility. There have been so many sure commercial methods that the man who finally reaches the goal, in whatever future century, may have cause to wish that the honor had fallen upon other shoulders than his own. In the meantime "new" processes without number will receive the authorization of the Patent Office and at certain intervals the epidemic will bring into print some accounts of the methods.—*American Manufacturer and Iron World*.



boat that now takes a week to discharge, will, it is stated, by the help of these coal hoisters, be discharged within forty-eight hours of berthing. These machines will be able to work on two or three ships at a time, and the saving of labor is apparent. There will result an enormous decrease in "small," as there will be no coal dust flying about. Every bit of coal will be put into buckets and carefully unloaded again, none being wasted.

These suspended bridge tramways, or, as they are popularly called, coal hoisters, are each 353 feet 9½ inches in length. They have the appearance of an aerial bridge with a cantilever-arm extension at either end. The method of working is as follows: On a suspended track on the bridge, a 14-inch gauge runs a trolley carrying buckets, each having a capacity of 1 ton. On arriving over the hold of the ship, the bucket is automatically lowered. The buckets can be unhooked, so that three or four can be filled at the same time. When the bucket is filled, it is raised again to the trolley and run back and discharged at any point on the quay or into railway trucks. A bucket can be raised from

23 feet on either side of the center. The object of this is to allow a greater area of the quay to be covered, and it is also useful in preventing the twisting of the bridge in case of slipping of the wheels. There is another automatic arrangement by which the coal below the bridge may be scooped up and loaded into trucks or barges. This is done by a scoop bucket, and is absolutely independent of manual labor. The weight of the entire plant is about 800 tons. All the material is soft steel, combining the greatest strength with lightness.

Wooden Spikes.

Hardwood spikes, or spike plugs, are being tried on several railways in France, to increase the holding power of ordinary screw spikes when driven in ties of Baltic pine and other soft woods. Holes about 1⅜ in. diameter are bored in the tie, and tapped to receive screws of hard wood 1⅜ in. diameter at the bottom and 2 in. at the top, each with an iron band to prevent splitting. The wooden screws are hollow, and the iron spikes or screw spikes are driven into them. The increase in holding power is said to be from 30 to 40 per cent. for new pine ties, while in old ties it is from 33 per cent. for beech, to 62 per cent. for oak, and 80 per cent. for pine.—*Trade Journals Review*.

bottom, they immediately receive the centrifugal force. The lighter material and water are carried upward and out of the cone over the rim; the heavier materials are deposited along the sides of the centrifugal cone, and are gradually carried up the same until they are collected under the rim, where they are prevented from escaping with the lighter matter and water, so that all the materials of great specific gravity and value are retained in the centrifugal cone, while the waste materials are passed off.

Less than one minute is required to stop the operation, clean out the gold, and put the machine into operation again.

This gold washer can be used in all gold-bearing placers, gravel, sands, clays, mud, slimes, etc., and the quantity of water required in its operation can be limited to simply moistening the material treated.

The machines require very little power, and can be constructed for convenience of transport so that no one part will weigh more than 60 pounds.

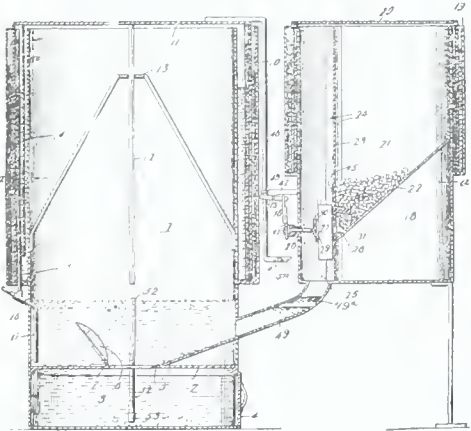
In this process, no quicksilver is used, and all the rusty, float, and flake gold is saved, as well as the very fine gold.

CLEVER NEW PATENTS.

Gas Generator.—Pea Huller.—Combined Trestle and Kettle Hanger.—Band Sawing Machine.—Mantle Transporting Device.

Gas Generator.

With so many different kinds of acetylene gas generators, good, bad, and indifferent on the market, it would seem as if nothing more could be done in this line, and yet, every once in a while a really good idea is evolved by some thoughtful inventor. Such is the case of the generator just patented by a resident of Wilkesbarre, Pa., Mr. Albert M. Dimmick, by name, a well-known inventor. As will be seen by reference to the accompanying cut, a gasometer 1 is provided, having a vertically movable bell, and a carbid reservoir is located to one side of this gasometer, said reservoir being connected with the gasometer by an inclined pipe 49. A rotary valve 27 of novel form controls the supply of the carbid, and is operated by a depending arm 46 secured to the gas bell. As the gas bell descends, the valve is operated to permit a supply of carbid to feed down the inclined chute 49 into the gasometer, where the generation of gas



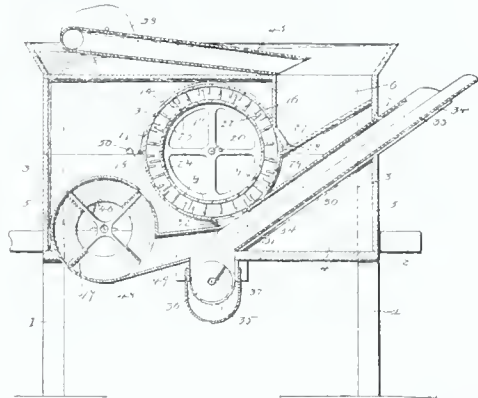
takes place, the spent residue gravitating down into a lower pocket that can be closed by a valve 6. The operation is automatic, and the gas is generated as required and as fast as it is used. No gas can escape, and therefore all danger of explosion is eliminated.

Pea-Huller.

A very ingenious and efficient pea-huller has recently been patented by Mr. John M. Sanders, a resident of Dalton, Ga. The construction of the device will be readily apparent by referring to the accompanying illustration, which is a vertical, sectional view through the machine showing the general arrangement of the parts. A suitable casing is provided which is supported upon standards or legs 1, and within the casing is arranged a concave formed of hinged sections and having inwardly projecting teeth. A hopper 6 leads to one side of the concave, and the discharge opening 31 leads from the bottom of said concave to a discharge chute 33 extending out through the side of the casing. The hulling cylinder is located within the concave and is secured to a suitable shaft 20 that is connected with any suitable source of power. A fan 46 is arranged to one side of the concave and below the same and has an ex-

haust nozzle 49 that communicates with the lower end of the discharge chute, beneath the discharge opening 31 of the concave.

A transversely disposed pocket having a screen bottom 35 is located directly below the junction of the discharge nozzle 49 of the fan and the lower end of the discharge chute, and a worm conveyer 36 is arranged within this pocket. At the end of the screen outside of the machine frame is located



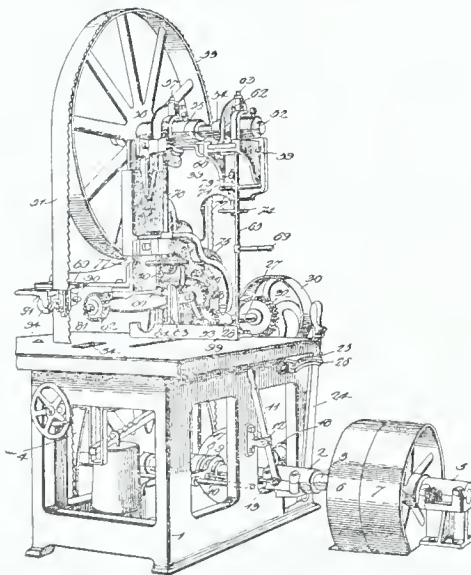
a conveyer casing or chute within which operates an endless conveyer, and an inclined return chute 45 leads from the upper end of the conveyer casing to a point above the hopper as clearly shown in the illustration.

In operation, the peas are feed into the hopper and fall through the side opening 29 against the side of the cylinder over which they are carried, making about two-thirds of a revolution, thus insuring a thorough hulling action between the cylinder and concave. The hulled peas readily fall by gravity through the screen, while the detached pods and trash are blown through the delivery chute by the force of the air from the fan. In case any of the pods are not broken from the

peas they will drop into the screen and be conveyed by the spiral conveyer to the endless elevator, which will take them back to the hopper.

Band Sawing Machine.

Those interested in sawing machinery, will be glad to hear that at last an automatic feeding mechanism has been provided which is adjustable to any size timber, and which will automatically take care of such timber without becoming deranged or broken. The inventor is Mr. Frank Diehl, of Sheboygan, Wisconsin, and while the apparatus is primarily intended for band sawing machines, it may be employed for other classes of saws. A very good idea of the improvement may be gained from the accompanying cut, showing the complete ma-

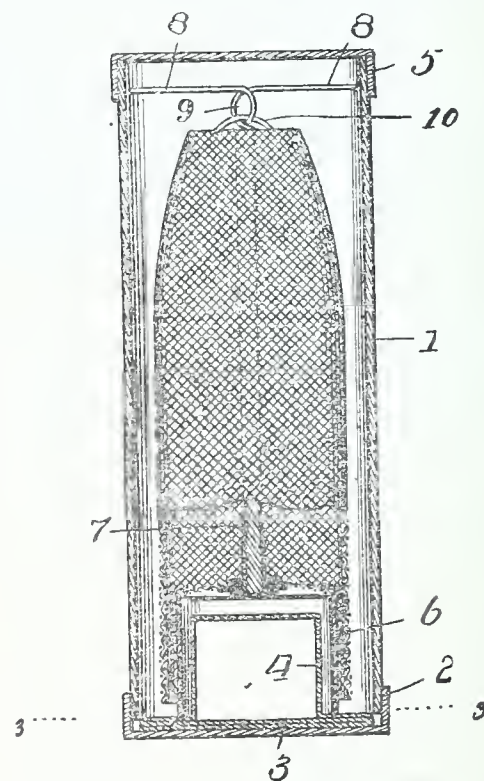


chine. The band saw is shown at 51, and a pair of feed rollers are arranged directly in front of the same, one

being located below the table and projecting through the same as shown at 34, the other, 82, being arranged above the table and journaled upon a shaft 80 that is vertically adjustable through suitable hand-operated mechanism shown at 76 and 78. This shaft 80, is operated by means of a plurality of intermeshing gears 86 which are secured to pivotally connected links 88, these gears being driven by a power shaft shown at 27. It will thus be seen that the lower feed roller 34 always maintains its same relation to the table, but the upper roller 82 may be raised and lowered, and therefore moved away from, or toward, the lower roller to accommodate different sizes of timbers to be cut.

Mantle Transporting Device.

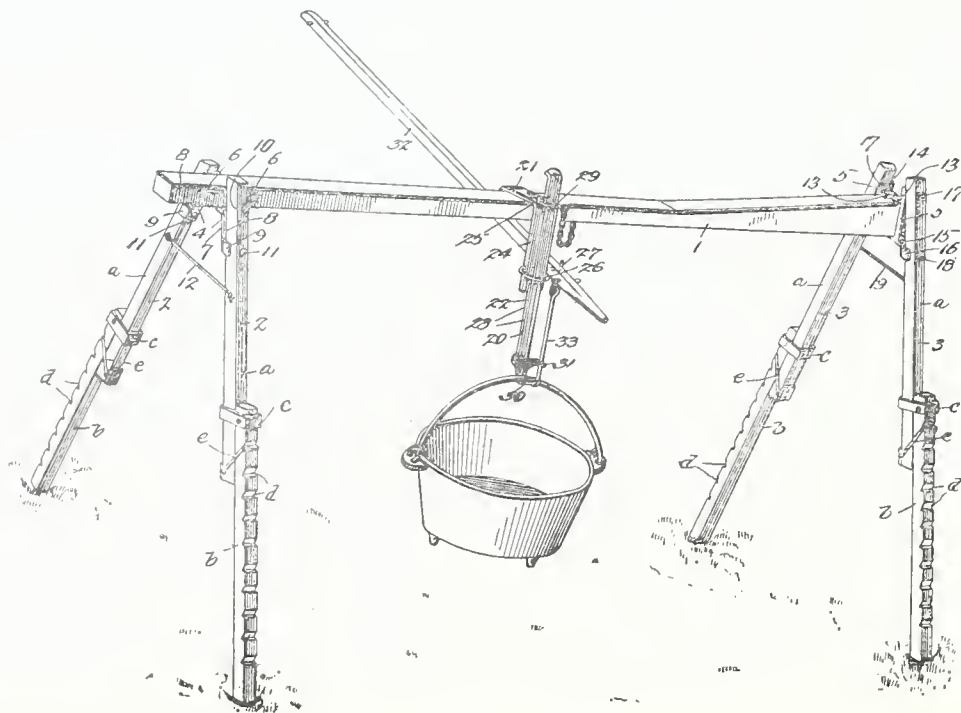
Considerable difficulty has always been experienced in transporting Welsbach or incandescent mantles because of their fragility; but it is believed that the device originated by Mr. John F. Bredow, of Davenport, Iowa, obviates all the difficulties. At any rate, the invention is so well thought of, that the Iowa Mantle Company has purchased the same. He provides a cylindrical casing made of pasteboard and having open ends. Fitted to the bottom of the casing is a cap of ordinary construction, and resting upon this cap is the lower support or post 4 for the mantle, said support consisting of a strip of material bent upon itself to form a base, and having an upstanding portion extending within the mantle to properly position the same. The top of the casing is also closed by a cap of the



usual construction. The mantles are usually shipped with the burner cap or mantle carrier and mantle support attached, so as to be in condition to be slipped over the burner. The mantle carrier or burner cap fits snugly over the upstanding portion of the lower support as shown, thus positioning the mantle out of contact with the sides of the case. The mantle support rises centrally within the mantle, and its upper end is secured against movement by means of outstanding arms 8, that engage the same and also the inner sides of the casing.

Combined Trestle and Kettle Hanger.

Mr. David W. Inman, of Versailles, Ohio, is an inventor who has a number of valuable patented devices to his credit in the Patent Office, and that he has not yet run out of novel ideas, is evidenced by another patent granted to him on a combined trestle and kettle hanger. This device may be employed by carpenters or mechanics, or can constitute a support by means of which a kettle may be suspended over a fire. In carrying out the invention, a horizontal beam is supported at its ends by legs or stand-



ards made up of slidably associated sections, whereby said standards may be lengthened or shortened to raise or lower the horizontal bar. These standards are secured to the bar by suitable devices, and are held against spreading by means of hooks that connect them. The kettle hanger is also made of sections slidably mounted, one section having a kettle-engaging hook, the other having an off-set arm arranged to engage over the horizontal bar. In connection with this device, the inventor also employs a lever by means of which the kettle may be transported and hooked in place above the fire.

A REMARKABLE CAREER.

A Man of Many Talents.

Rev. William L. Selleck, the subject of this article, has had a remarkable career, both as an inventor and as a divine healer. He was born in Canada, February 22, 1837, and moved to Milwaukee, Wisconsin, in 1891. He is a machinist by trade. His grandfather, Charles Selleck, was a ship carpenter for England in the war of 1812, and owned 600 acres of land on which Kingston, Canada is now situated. He sold it on a 90 years lease. His father, G. T. Selleck, was a millright by occupation.

In the year 1869, while running a machine shop in Milwaukee, Rev. Mr. Selleck invented the Turbine Water Wheel. In 1890, the Champion Turbine Water Wheel and the Bob Sleigh. From Milwaukee he removed to Millville, and then to Platteville, Wisconsin. In 1899, he resumed inventing and obtained a patent on a corn feeder through E. G. Siggers; then a patent for a base lengthener for



WILLIAM L. SELLECK,

printer's forms. In 1901, a hinge for barn doors, and an engine that runs without a crank, the cylinder moving around. It gets all the power out of the steam.

Notwithstanding his contribution to the mechanical arts, Mr. Selleck regards as his greatest achievement in life his ability to relieve suffering humanity of physical ailments. In the year 1891 he was about to die with a disease that baffled medical aid. He writes, "It was a malady that could be reached only through God, and I turned to Him with all myself and He healed me at once. I have never been sick since, or had a pain or an ache. Since then I have always talked for Him, and others that have been dying have come to me and have been healed by the hundreds. We give God all the glory and praise His name."

Testing the Purity of Water.

When leaky ditches, sinks or sluices are in the neighborhood of fountains or canals, small quantities of impure water are apt to become mixed with the pure water. Their presence may not be betrayed by the bad taste or

smell of the water; yet it is of the utmost importance that even the slightest impurity in drinking water should become known at once, so that sanitary measures for the improvement of the same can be undertaken without delay. As a simple means of trying whether or not ditches, etc. are leaking it is recommended to pour a mixture of saprol and fluorescin into the same.

When the ditch is leaking, the saprol as a rule quickly finds it way out of it, mixes with the fountain water and imparts to the same, even if diluted a million times, a tar or gas-like smell which is distinctly noticeable. Furthermore, the taste of the water becomes tarry and it acquires a greenish color.

Whenever these signs are noted, there is a clear proof that the contents of the ditch or sink have reached the fountain, and that the water in the latter has become dangerous to health and should not be used.

Milk Flour in Sweden.

At the November meeting of the Academy of Agriculture, at Stockholm, the news of a discovery was imparted which promises to be of importance to the dairy industry of the Scandinavian countries, and of the whole world as well.

Dr. M. Ekenberg, of Gothenberg, Sweden, described a process of changing milk into a fine flour that afterwards, through solution in a sufficient quantity of water, may again be transformed into milk with all its alimentary qualities.

Dr. Ekenberg would not give a description of the apparatus, as he has applied for letters patent. According to his calculations, the apparatus should not cost more than a common separator.

The working expenses for the production of milk flour have been calculated at 1 cent per gallon of milk.

The peculiarity of Dr. Ekenberg's discovery lies in his having found the conditions under which the milk will retain its solubility in water in spite of the transformation into powder. Formerly, when milk was dried, the components became indissoluble.

The transformation of milk into powder requires a special apparatus, which is said to be so simple that it can be placed in any dairy, requiring no technical knowledge to operate.

The milk flour resembles wheat flour, and has the aroma of milk. It can be kept in tin cans, wooden barrels, and even paper sacks. One part of the flour, in weight, gives about ten parts of milk. It is simply concentrated milk, in the form of flour; it contains all the constituent parts of milk, except the water and gases. It does not turn sour or effervesce, and is not susceptible to changes in the weather. Samples have been kept for weeks with a thermostat at blood temperature, and no changes were noted. Even in damp air, without protection, it does not turn sour nor become moldy. From the milk flour, cream, butter, and cheese may be obtained. It can be used in baking bread, puddings, etc.

Flour of skimmed milk was also exhibited by Dr. Ekenberg before the Academy of Agriculture, and it is particularly for this article that the new process will be of importance, as the product has hitherto been largely wasted. The flour will be found to be superior to such preparations as "protoid" and "proton," as 10 to 20 per cent of the albumen of the milk is lost in the production of the latter, and the flour can be produced much more cheaply. Skimmed milk is said to be the cheapest albuminous aliment known. The process for the production of milk flour is so simple that the article can be profitably sold at 12 cents per pound, and even less, provided skimmed milk can be obtained at 2.9 cents per gallon.

IMPORTANT DECISIONS IN DESIGN PATENTS.

U. S. Circuit Court of Appeals.—Second Circuit.

Rowe v. BLODGETT & CLAPP CO.

Decided November 14, 1901.

1. DESIGNS—HORSESHOE CALK—MECHANICAL UTILITY—INVALID.

Design Patent No. 26,587, granted February 2, 1897, to Allen H. Rowe for a horseshoe-calk, *Held* invalid because the shape of the device was designed merely to enhance its mechanical utility and not for the purpose of display or ornament.

2. SAME—"USEFUL"—APPEARANCE—WORKS OF ART AND DECORATION.

Design patents refer to appearance, not functional utility, and their object is to encourage works of art and decoration which appeal to the eye, to the esthetic emotions, to the beautiful. The term "useful" in relation to designs means adaptation to producing pleasant emotions.

3. SAME—ATTRACTIVE APPEARANCE—DESIGN NOT A TRADE-MARK.

Where there is nothing attractive about the appearance of a design and its shape does not appeal in any way to the eye or serve to commend the article to purchasers, except to indicate that it is the product of the patentee, *Held* that it is not patentable. Designs cannot be considered as trade marks.

Commissioner's Decision.

EX PARTE STECK.

Decided December 31, 1901.

1. DESIGNS—USEFUL—MECHANICAL DEVICES.

The word "useful" placed in section 4929 of the Revised Statutes by amendment leaves no room for doubt that articles intended for mechanical use can properly be made the subjects of design patents.

2. SAME—PATENTABILITY—QUESTION OF BEAUTY NOT CONTROLLING.

An article of manufacture designed primarily for the performance of a mechanical function and not for the purpose of beauty may please the taste better than those that have gone before it, or it may not; but this is not con-

trolling so long as the shape is new and is the result of inventive thought.

3. SAME—FUNCTIONAL UTILITY—NOVELTY IN APPEARANCE.

Functional utility cannot be given the same consideration and effect in design cases as in mechanical, since designs are judged by their appearance, whereas mechanical inventions are judged by the functions performed. In a design there must be novelty in appearance whether or not new functions are performed.

4. SAME—TEST OF INFRINGEMENT AND ANTICIPATION—APPEARANCE.

Notwithstanding the insertion of the word "useful" in the statute, the sole test of infringement and anticipation in design cases is similarity in appearance such as would deceive an ordinary observer and induce him to purchase one supposing it to be the other.

5. SAME—MACHINE NOT PATENTABLE AS A DESIGN.

Under the express provisions of the statute a design patent is limited to "an article of manufacture," and there is no warrant in the law for granting such a patent upon a machine whose parts bear certain functional relations to each other.

6. SAME—SAME—MOVABLE PARTS—CHANGE IN APPEARANCE.

Aside from the express provision of law a machine made up of movable parts whose change in position changes the appearance of the device could not be patented as a design, because the subject-matter of the patent would not be definite and certain.

7. SAME—ARTICLE OF MANUFACTURE MOVEMENT OF PARTS.

In the case of a single article of manufacture there may be some relative movement of the parts without changing the appearance of the article or taking it outside of the design law; but nothing which amounts to a machine can come within the law whether or not the motion of the parts materially changes the appearance of the device as a whole.

8. SAME—FRAME FOR WATER-TOWER MACHINE—NOT PATENTABLE.

A frame of a water-tower for the use of fire departments consisting of the frame proper and a hose-support hinged or pivoted to it and adapted to be raised to a vertical position, *Held* to constitute a machine which is not patentable as a design.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. SIGGERS, Washington, D. C.

Richard Griffiths, Barclay, Kansas. Grinding Mill Conveyor.—This patent is of particular interest to farmers, because it discloses the only grinding mill which has ever been equipped with a conveyor operated by the power mechanism of the mill, to convey the flour, meal or other product from the mill to a remote point. The device is exceedingly simple, and comprehends the ordinary sweep mill having an endless conveyor with one end extended under the mill and geared to the sweep. As the sweep is carried around to operate the mill, the conveyor is moved and the ground product is conveyed from the mill to a wagon or other receptacle. If desired an endless or other elevator may be connected to the outer end of the conveyor and geared to it, so that the draft animal connected to the mill sweep may furnish the power for operating the mill, the conveyor and the elevator. This conveyor attachment saves the labor of a number of helpers, and as it is inexpensive, the Griffiths Combination Mill and Conveyor is sure to meet with unusual success as a commercial proposition.

David P. Burdon, Jacksonville, Florida, Two patents. Liquid Elevating System and Electric Fan Motor.—The first mentioned patent discloses an entirely new apparatus for raising water from any suitable source of supply to an elevated tank. A vacuum is created by an explosion which forces the water into the elevated tank. Between the vacuum cylinder and explosion chamber is located a valve which is moved to its open position by the force of the explosion. The mechanism for admitting a charge of explosive fluid to the explosion chamber is disposed for actuation by this valve, and said valve also controls the igniting mechanism. The parts are so related that the retraction of the explosion-operated or piston valve, after an explosion, will recharge the explosion chamber and ignite the charge in quick succession, so that the operation of the apparatus is rendered automatic and continuous.

The second patent is an electric motor designed to swing fans' back and forth. It comprises a pair of field magnets, each having an independent circuit that can be connected up with an ordinary battery. Between these magnets is journaled an oscillating armature that is operated by the alternately energized magnets. This armature carries a shank to which may be attached an ordinary palm leaf fan. The armature also operates a reciprocating switch of novel form which controls the separate circuits of the field magnet. By this arrangement, ordinary batteries may be employed so that the fan may be used in places where no heavy source of electrical energy is to be had.

Mr. E. F. Cavellier, of Jacksonville, Fla., is a part owner of the fan motor patent.

Charles Langdon and Oscar Rydman, Missouri Valley, Iowa. Buckle.—The device is primarily intended for traces, but may be employed for connecting various kinds of straps. It consists of a body having a cross bar to which one end of a strap is secured, and a passageway through which the other strap is passed. One wall of the body has an inclined opening in which is slidably mounted a clamping tongue having an inwardly-projecting tooth that is arranged to extend across the passageway and engage the strap, an opening being made on the opposite side of the passageway to receive the end of the tooth.

Floyd F. Dawson, Wilson, N. C. Music Chart.—The object of the invention is to provide a simple article, by means of which a person entirely unacquainted with music may readily learn simple chords. The invention consists of a sheet or strip that is placed directly over the keys and is provided with an intermediate transverse space called a "key finder." On the right of this space are arranged a number of finger spaces of different lengths, colors, and numbers, which are so disposed that they will be located directly over the proper keys to be operated upon by the right hand. On the left of the key finder space are arranged similar spaces for the left hand or bass. The differently colored and numbered spaces represent the different chords, so that by operating upon the keys, directly beneath the same, said chords may be readily played.

William Blanchard, Scranton, Miss. Valsin DeJean, Louis P. DeJean, C. E. Chidsey, George W. White, Miller & Miller, assignees. Vessel.—The recent discovery of oil wells in the South, has created a demand for better transportation facilities, and in order to meet this demand, Mr. Blanchard has patented this vessel designed for carrying oil in bulk. The hull is of the usual general shape, but the interior is divided into separate compartments, being spaced from the outer sheathing of the vessel, and from the upper deck. The space between the cover and the upper deck is open to permit the entry of water, so that the oil will be protected from any inflammable material. Communication may be had through the several compartments by means of valved ports, and pipes lead from said compartments to pumping mechanism, whereby the vessel may be readily unloaded. In order to take care of any gas that may arise from the large body of oil, a novel system of vent pipes is arranged in the upper portions of the compartments. The vessel may be constructed either in the form of a barge or a steamer.

David B. Whitehill, North Clarendon, Pa. Two patents, Stop Cock and Carpenters' Square.—Mr. Whitehill is an inventive genius and his inventions always reflect much thought on his part. The stop cock is an improvement in that class in which a turning plug is employed. One feature resides in arranging the bore, which receives the plug, at one side of the center of the shell. This gives as little obstruction as possible to the passage of fluid through the cock. Another improvement consists in providing the turning plug with a valve at one side, and to cause outward adjustment of the valve so as to keep it in engagement with its seat, a tongue is provided, and means, such as a threaded bolt, to cause the tongue to bind against the valve seat.

His second patent relates to an improvement in carpenters' squares, whereby the same may be securely fastened in position while a mark is being made on timber. In the use of carpenters' squares, it is sometimes very difficult for the carpenter to hold the square with one hand while marking with the other. Mr. Whitehill overcomes this objection by providing the square with a number of small holes, and a plurality of sharpened prongs which extend through the holes and engage the piece of wood to which the square is applied. The prongs are each carried by a button and a flexible connection is made between the buttons so that when the square is not in use, the buttons carrying the prongs can be thrown around the neck of the carpenter or carried in the pocket.

William C. McNaught, Johnstown, Pa., and George Griffith, same place, assignees. Brick Molding Apparatus.—This is a very simple

hand-operated apparatus, by means of which several bricks may be made at once. A mold body is provided consisting of side and end walls, and a plurality of intermediate partitions forming a number of mold chambers which are open on both sides; the end walls having outstanding flanges which constitute handles. A brick-exPELLING follower comprising a plurality of follower blocks that fit in the mold chambers and are secured to a cross bar, is arranged to co-act with this mold body. In operation the body is first placed upon a platform, and the chambers are filled, after which the body is moved upon a pallet. Here the follower is placed upon the body, and as said body is raised, the bricks are expelled from the chambers upon the pallet. The latter is then taken to the drying apparatus, and from thence to the kilns, there being no necessity for repressing the brick.

George A. Kelly, Longview, Texas. The G. A. Kelly Plow Company assignees. Plow.—This gentleman who has been a manufacturer of plows since 1860, and who has devised many important improvements on the same, has just obtained three patents, two of which relate to a novel construction of a beam that is extremely strong, and yet comparatively inexpensive. This beam in its broad aspect, consists of spaced bars which may be made of strips of steel of sufficient thickness and strength, the bars being held apart by spacing blocks, the clevis being secured between their front ends. One of the patented structures relates more particularly to the turning plow, the standard of which is provided at its upper end and in its opposite side faces with seats in which the rear ends of the spaced bars are secured. A brace extends from the standard forwardly, and is fastened at its front end between the bars, said front end also constituting a spacing block for the same. The handles are made rigid by braces extending therefrom to the rear ends of the beam bars.

The other patent covers the structure as applied to a shovel plow beam. In this case there is secured between the beam bars, a suitable block having shoulders or sockets in its upper face, and the standard of the plow is adjustably secured to the beam by having a bolt that engages in the sockets. The rear ends of the beam bars are bent upwardly and in angular relation to the main portions, thus constituting projections to which the handles are secured.

The third patent is a design on the landside of a plow, and is an improvement over a former construction. In this former structure notches were made in the upper edge of the landside to receive depending projections of the standard, these projections receiving much of the strain and relieving the holding bolts of the same. In this case, the invention relates to the peculiar formation of the notches which have straight front walls, so that no matter how loosely the landside is attached to the plow, the shoulders of the standard will remain in engagement therewith.

William A. Holland, London, Ohio, & S. P. Wilson, same place, assignees. Hog Ringer.—This invention comprises a pair of clinching jaws having operating means, and blank feeding mechanism by means of which the blanks, from which the ring are afterwards formed, are taken and successively fed to the proper point between the clinching jaws, which jaws fold and clinch the blanks. A novel form of blank mechanism is employed whereby the same may be readily re-filled; and a wire cutter is made use of by means of which an improperly applied ring may be cut into and removed from the animal preparatory to the application of another ring. The invention contemplates other and minor features, providing a simple,

convenient and reliable implement especially adapted for the use of farmers, ranchmen, shippers, etc. for the purpose of enabling rings to be rapidly applied to hogs and other animals.

Daniel S. Monroe, Pueblo, Colorado. Tube Expander and Beader.—This tool is designed for use in expanding boiler tubes while the boiler is in operation without drawing the fire. It is to be actuated by a hammer or sledge and may be employed under all conditions. One part of the invention provides means whereby the degree of expansion may be regulated. Another point permits the flue to be beaded or calked at the same time that it is expanded. The invention, generally speaking, consists of a die formed of a series of radiating, tapered staves, a tapered mandrel to expand said staves, and operating means for actuating the mandrel, said operating means being united thereto flexibly, whereby the operative means may be actuated out of alinement with the mandrel. By this construction the expander can be actuated through the fire door from the outside of the boiler, if the leaks occur in the fire box end, or through the smoke arch manhole, or through the front or smoke arch head if the leaks occur in the front end of the boiler. The patent contains thirty-three claims, a number of which are very broad.

Jefferson D. McCabe, Woodbury, Tenn., T. M. Bryan, same place, assignees. Combination Shaft Support and Rein Holder.—This is an improvement on a previous patent issued to the same inventor and published in the INVENTIVE AGE for May 1901. In the former patent is illustrated a device which serves as a rein holder and shaft supporter and also a brace for the dashboard, consisting of a standard secured to the bottom of the vehicle and extending across the inner face of the dashboard, a shaft supporter being connected to the standard and located upon the exterior face of the dashboard and provided with means for holding the reins. The present improvements are three-fold in character. First, they provide for the effective bracing of the dashboard; second, the provision of simple and positive means for holding the shafts elevated, and third, improved means for holding the reins, these several improvements being carried out with a simplicity of construction which will commend itself to those having use for devices of this character.

Walter H. Laughlin, Lisbon, Ohio. Railway Gate.—This gate embodies a vertically-swinging arm formed in telescopic members, of which the outer member is shot outwardly during the downward swing of the arm by means of a flexible connection secured to the inner end of the outer section, passed through a guide upon the outer end of the inner section and secured to the upper end of the post upon which the arm is pivoted. The arm is held in an upright position by means of a laterally-projected spring plate carried by the inner side of one of the rails of the track, so as to lie in the path of wheel flanges, and a flexible connection extending between the free end of the spring plate and the lower end of the gate arm. When the flanges of the car wheel press the spring plate towards the rail, the flexible connection is loosened and the gate drops by gravity. The gate is held closed in a horizontal position by means of an upstanding spring catch, which is connected to a spring plate carried by the opposite rail and in the path of wheel flanges so as to be moved laterally by said flanges to release the gate, which is then elevated by the first-mentioned spring plate.



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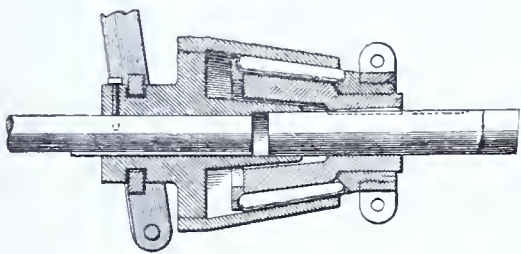
FOR SALE—Design Patent No. 35,420, dated December 10, 1901. Design for ferrule. Address J. K. W. Carson, Winchester, Kansas. (je)

FOR SALE—Canadian patent embodying same construction shown in U. S. patent No. 607,576, dated July 19, 1898. A journal bearing provided with means for securing a Babbit metal or similar lining to the same. Invention has been tested, and is now in use on entire A. T. & S. F. Railway System. Address J. A. Swan, 1194 Clay Street, Topeka, Kan. (je)

FOR SALE—U. S. Patent No. 686,591; also Canadian protection. Cable Oiler. Simple and inexpensive to make. Will oil or tar all kinds of wire cables. To those familiar with this class of work the merits of this patent will be immediately apparent, this being the only invention for oiling overhead cables. The oiler travels over the cable and every part of it is dipped. With this cheap device for oiling or tarring, cables can be made to give fifty per cent more wear. This patent is for sale, and can be made to bring large returns to the investor. For further particulars, terms, etc., address C. Larsen, Crockett, California. (my)

FOR SALE—Patent No. 680,106, dated August 6, 1901. Skirt Supporter. Can be made very cheap and will sell on sight. Patented in Canada and England also. Address C. H. Munson, 1710 Farnum St., Omaha, Neb. (my)

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FOR SALE—Patent No. 686,711. Belt or strap splicer for splicing leather. It is better than lining, rivets or hooks. Put on with hammer. Will sell outright or to manufacturer on royalty. Address R. E. Cain, R. F. D. No. 4, Piatte City, Missouri. (my)

FOR SALE—Patent No. 689,800, dated December 24, 1901. Pneumatic attachment for binders and headers. Provides a pneumatic blast to throw the grain against the cutting knives and onto the platform conveyor. Address Edward Hafermehl, Lawton, Oklahoma. (my)

FOR SALE—Patent No. 548,992, wagon brake. self acting. Also patent No. 573,663, self acting car brake. Will sell either separately or together. Good chance for promoter. Address I. 'at Brown, Birch River, Nicholas County, West Virginia. (my)

FOR SALE—Patent No. 613,441. Safety Bottle Crate. Patented November 1, 1898. Something new. Very valuable. Write for particulars. Address George Chappell, 615 Riverside Avenue, Jacksonville Florida. (my)

FOR SALE—Patent No. 687,240. Dated November 26, 1901. Dinner pot. Every household needs it. Address C. F. Kaul, Madison, Nebraska. (my.)

FOR SALE No. 691,134, dated January 14, 1902. Sham Bolster Form. Made of metal. Adjustable in length. Something entirely new. Address Miss Leontina Gully, Care Mrs. M. B. Pulliam, Uvalde, Texas. (ap.)

FOR SALE—Patent No. 689,296, dated December 24, 1901. Improved Stone Cutter's Tool. Has provision for making several different kinds of tools out of single structure. Is the invention of a practical stone cutter. Address Heber K. Hansen, Logan, Utah. (ap.)

FOR SALE—Patent No. 687,175, dated November 19, 1901. Anti skeleton Key Lock and Attachment. Construction very simple. May be carried in the pocket and applied for a single night if desired. Address Barry & Eberhard, 547 Howard Street, San Francisco, Cal. (ap)

FOR SALE—Patent 677,843, dated July 2, 1901. Automatic Electric Cut-out. Prevents waste in house lighting. Safeguard in pumping plants, etc. Address Frederick H. Rogers, San Jacinto, Cal. (ap.)

FOR SALE—Patent No. 684,064. Wagon Dump. A machine for unloading grain from a wagon into an elevator. For full particulars address Newton Inks, Ransom, Illinois. (ap.)

FOR SALE—Patent No. 688,833, dated December 17, 1901. Music chart to be used on either pianos or organs. Of great assistance to teachers. So simple that a child can understand it. Price of chart, with instructions, \$1. Address Floyd F. Dawson, Wilson, N. C. (ap)

FOR SALE or lease on royalty—Patent No. 683,923, dated October 8, 1901. Plow Share Clamp for holding plow shares while being hardened. Address Burton E. Foster, Rushmore, Minnesota. (ap)

FOR SALE—Patent No. 688,849, dated December 17, 1901. Conveyor for sweep mills. Operated by connection with the sweep. Just what the farmer has been looking for. Will sell state rights or lease on royalty. Opportunity for the manufacturer of sweep mills. Address Richard Griffiths, Barclay, Kansas, Rural Free Delivery No. 1 (ap)

FOR SALE—Patent No. 680,107, dated August 6, 1901. A Smoke Consumer. Designed to consume the smoke and economize fuel by burning the gases contained therein. Address George Allen, Franklin, Pa. (ap)

FOR SALE—Patent No. 686,115, Hydraulic Air Compressor. Can be installed cheap from any elevated water supply. Tested 90 per cent. Also patented in Canada, England, Germany and Denmark. For full particulars address F. A. McRae, 563 St. Urbain Street, Montreal, Quebec, Canada. (ap)

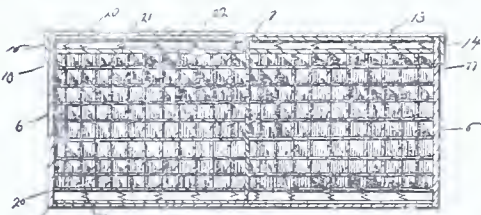
FOR SALE—Patent No. 685,288, dated October 29, 1901. Lathe and Milling Machine Indicator. Necessary for accurate work. Useful in every shop. Just the thing for fine tool manufacturers. Address J. C. Miller, Bloomfield, N. J. (ap)

FOR SALE—Patent No. 688,654, dated December 10, 1901. Buckle. Especially intended for trace buckles. Can shorten or lengthen four tugs in one minute. Gives an even strain on the whole width of tug without binding or breaking. Outside smooth. Will not tear fly-nets. Address Langdon & Rydman, Box 192, Missouri Valley, Iowa. (ap)

FOR SALE—Patent No. 688,148, dated December 3, 1901. Fire Place. For neatness, simplicity, durability and economy it cannot be surpassed. Will sell outright or lease on royalty. Address L. B. Arnold, Hanly, Kentucky. (ap)

FOR SALE—U. S. Patent No. 649,646, dated May 15, 1900. Also Canadian patent 73,402, dated October 15, 1901. A double band umbilical truss. Bands are tightened simultaneously in opposite directions. Should find much favor among manufacturers and specialists. Will sell entire right or state rights. For information address D. S. Plum, Pleasant Valley, California. (jy)

FOR SALE—Patent No. 651,887. Spring Egg Case. Will sell outright or lease on royalty. The eggs are placed on springs and protected from breaking. Address Jesse P. Riley, Point, Louisiana. (my)



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WANTED—I have a patent pending for an improved blackboard eraser. Would like to have same manufactured on royalty or contract. Address L. B. Williams, Greenville, Texas. (my)

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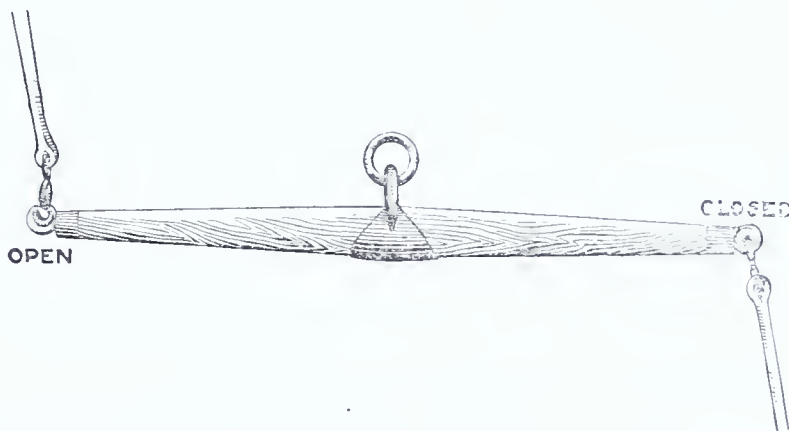
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DESIGN PATENTS.

The Change in the Practice.

In this month's issue of the AGE we print the syllabus of two interesting as well as important decisions. One is by Commissioner Allen, and the other by the United States Circuit Court of Appeals for the Second Circuit. Both of the decisions relate to design patents, but treat this subject from different standpoints.

In *ex parte* Steck the Commissioner very properly held that the word "useful," which was inserted by amendment in section 4929 of the Revised Statutes, meant that articles intended for mechanical use could properly be made the subjects of design patents, though a machine was not patentable as a design, for the reason that the statute expressly excluded machines by making reference simply to "articles of manufacture," under which designation a machine could not be classed.

With reference to those decisions of his predecessors in which patents had been refused on articles of manufacture having movable parts, the Commissioner stated:

"There may be some relative movement of the parts without changing the appearance of the article or taking it outside of the design law."

In the particular case considered by the Commissioner, the applicant had applied for a patent on the frame of a water-tower, used by fire departments, and consisting of the frame proper and the hose-support hinged or pivoted to it, and adapted to be raised to a vertical position. The Commissioner decided that this subject-matter constituted a machine which was not patentable as a design.

The case before the United States Circuit Court of Appeals related to a horseshoe calk, on which design patent No. 26,587, was granted February 2, 1897, to Allen H. Rowe. The Court held that the design patent was in-

valid, because "the shape of the device was designed merely to enhance its mechanical utility, and not for the purpose of display or ornament."

Some of our readers may not know that the United States Circuit Courts of Appeal are now the courts of last resort in patent causes, and that the only way the Supreme Court may obtain jurisdiction in patent matters is by a writ of certiorari. As there are nine circuits, it is conceivable that the question decided by the Circuit Court of Appeals for the Second Circuit, might be decided differently by the Court of Appeals of one of the other nine circuits. Should such a condition arise, it is within the power of the United States Supreme Court to order the case "to be certified to the Supreme Court for its review and determination with the same power and authority in the case as if it had been carried by appeal or writ of error to the Supreme Court." Until this is done, however, the decision of the Circuit Court of Appeals for the Second Circuit may be accepted as authoritative on the subject.

The horseshoe calk case originated in the Circuit Court of the United States for the District of Connecticut. The suit was for the infringement of a design patent. Judge Townsend in rendering his decision said:

"Design patents refer to appearance, not utility. Their object is to encourage works of art and decoration which appeal to the eye, to the esthetic emotions, to the beautiful. A horseshoe calk is a mere bit of iron or steel, not intended for display, but for an obscure use, and adapted to be applied to the shoe of a horse in snow, ice and mud * * * The term "useful" in relation to designs, means adaptation to producing pleasant emotions. There must be originality and beauty. Mere mechanical skill is not sufficient."

The decisions on which Judge Townsend based his opinion were *Northrop v. Adams*, 12 O. G., 430; *Smith v. Saddle Co.*, 63 O. G., 912; and *ex parte* Parkinson, C. D., 1871.

Commenting on the Circuit Court's decision, Commissioner Allen in *ex parte* Steck said:

"The broad statements in *Rowe v. Blodgett & Clapp Co.* cannot be accepted as authority for refusing all designs relating to mechanical devices. The statute itself is controlling in this matter, and these apparently conflicting rulings by the Circuit Courts are believed to be of little aid in construing it."

We believe the views of the Commissioner in *ex parte* Steck to be correct, and it is to be regretted that there appears to be a disposition on the part of the Patent Office at the present time to depart from its principles. There has been no decision rendered by the Supreme Court of the United States which justifies the broad expressions found in the decision of the Circuit Court of Appeals in *Rowe v. Blodgett & Clapp Co.*

In the well-known case of *Smith v. Whitman Saddle Co.*, the Supreme Court said:

"Where a new and original shape

or configuration of an article of manufacture is claimed, its utility may be also an element for consideration."

According to the view of the Circuit Court of Appeals, the esthetic emotions only must be appealed to in a new shape or configuration of an article of manufacture. Its mechanical utility is of no consequence. While it may be true that the action of the Court of Appeals in the horseshoe-calk case was correct, and that the Patent Office made a mistake in issuing a design patent thereon, still the facts before the court did not justify the sweeping statement on its part that the design patent statute had reference solely to works of art and decoration. It is singular that the court should have based its decision on a Supreme Court case, which did not bear out its line of argument, as well as the decision of the only Commissioner of Patents who looked on design patents with disfavor. The court threw aside every favorable decision of the Patent Office on the subject of designs, and adopted the view of Commissioner Leggett that the design patent law was intended to provide for a class of inventions in the field of esthetics, taste, beauty and ornament.

There is one way of interpreting the decision of the Court of Appeals in the horseshoe calk case by limiting it to that class of design patents on mechanical inventions, where the shape or configuration seems to have been adopted *solely* for mechanical purposes. Because the peculiar shape of an article of manufacture is not only ornamental but useful, should not bar it out as a design patent. However, judging from recent issues of the Patent Office Gazette, it would seem, that the Division of Designs has accepted the decision in the horseshoe-calk case as rendered, and is refusing the grant of patents on a majority of the applications presented. In the week of January 7, 1902, when *ex parte* Steck was published in the Official Gazette, there were twenty-six design patents illustrated. In the week of March 25, 1902, four design patents were issued. The comparison between these two figures makes clear the havoc that was made by the decision of the Court of Appeals in the matter of issuing patents for designs.

The future of design patents appears to be in a chaotic state. For the present, at least, it would seem to be good policy to withhold the filing of all applications for design patents on purely mechanical improvements, where the change made in the form of the article does not clearly indicate that it was made for the purposes of display or ornament.

Our personal opinion is that while the Circuit Court of Appeals was correct in deciding that the patent on the horseshoe-calk was not valid, it went too far in holding the design patent law to comprehend only works of art and decoration which appeal to the eye; and that the Patent Office ought to construe this decision narrowly, and should not, because of its terms, refuse the grant of patents on mechanical inventions where a different shape or configuration appears.

The Relation of the Scientific Education of the Germans and Their Commercial Prosperity.

Now that Prince Henry is taking a much needed rest, and all the diplomatic fuss attending his presence in our midst is over, we can settle down and take a look around. It will be commercially becoming for us to endeavor to see just wherein certain methods which obtain in the land of our distinguished ex-guest, exceed ours. Let us not deceive ourselves. Let us not permit our heads to swell with our commerce. True, we are making gigantic strides, but in rejoicing over our unparalleled successes, we must not lose sight of the rock-bed principles on which all success rests. In technical education and in the practical application of scientific knowledge, Germany is far ahead of us. Let us compare German methods with our own—lest we forget.

For the last 75 years all the German universities have had their own chemical laboratories. In the German factories, a host of trained chemists and assistants, numbering some 9,500, are constantly at work, endeavoring to improve processes and lessen the cost of production.

A case in point is the manner in which they have applied scientific methods to sugar. Over sixty years ago they crushed 154,000 tons of beet root, from which they derived 8,000 tons of sugar. In 1860, 1,500,000 tons of beet root were converted into 128,000 tons of sugar. In 1901, 12,000,000 tons were crushed, placing 1,500,000 tons of raw sugar on the market.

Again, in the matter of chemicals, dyes and dry colors, their superior methods meant a gain for them in a single year of \$30,000,000. This constant application of trained minds has so cheapened the cost of production that this trade has been gradually drawn away from England.

Distant India was made to feel the force of German technical knowledge when, thirty five years ago, her natural-indigo trade was nearly ruined by the discovery of a chemical process for manufacturing artificial indigo.

Another discovery resides in a method for obtaining ground slag from steel processes. Even steel producing England is buying ground slag of Germany for fertilizing purposes.

The latest discovery is an improved method of hardening steel. If this process will do all that the inventor claims for it, it will revolutionize naval matters. The chemist, Herr Giebler, is a loyal subject of His Majesty, for he will not sell his secret to any foreigner, but will guard it for the benefit of his Fatherland.

In this connection we can not fail to note the strides taken in the manufacture of scientific instruments. A century ago France and England were the recognized leaders in this line. In the last two decades, 14,000 people have become identified with the making of scientific instruments. In 1898 alone the Germans were enriched to the extent of \$1,250,000 by this one department of skilled labor.

It is a long story. Many more instances could be cited of the substantial gains made by Germany through her policy of marrying scientific treatment to productive industry. The moral is obvious.

The conclusions to be arrived at from the foregoing are not so much

academic as economic and practical. In Germany, a young man is called upon to decide, early in his career, whether he will take a classical or a scientific course. If he decides to take the latter he goes into the "Real Schule," or lower scientific school, to be elevated thence to the "Real Gymnasium," or scientific high school, and thence to the "Polytechnium," or institute of technology, which is separate from the universities. In this course, he has no Greek and only a moderate amount of Latin; but he has the sciences, engineering, mathematics, modern languages, history, and a mixture of practical and theoretical training in various technical branches, with frequent excursions for the purpose of inspection of work in factories and public enterprises. The faculties of these institutions keep in touch with the manufacturers, and when capable young men graduate they easily find situations. This is also true of the technical high schools, of which there are twenty-four, which likewise have courses in engineering, architecture, drainage, irrigation, modeling, drawing, chemistry, modern languages, history, etc. The questions for the people of the United States are: Is our system of education as perfected as it should be? Have we sufficient scientific education of the best grade, and are our educational institutions in close enough touch with the manufacturers to supply their needs? If not, are we not hampered in competition with our great commercial rival, which enjoys this complete cooperation?

The Imperial Department of Commerce and Industries has been of great assistance to the German manufacturer. It has been an intermediary between the educational and practical work, guiding the one, sustaining the other, and providing information to the manufacturer, first in beginning his industry, later in expanding it, and finally in marketing his surplus.

The ten million dollars which that great benefactor, Andrew Carnegie, recently donated to the United States Government to be used for higher education, will supplement the ceaseless investigation now being carried on by our colleges and Smithsonian Institution. The day is not far distant when our university work will compare favorably with that of Bonn, Heidelberg, or Göttingen. It can not come too soon.

Infectious Colds.

Gradually, one by one, diseases formerly supposed to be non-infectious are being transferred to the infectious column. Comparatively few years ago it was supposed that one could live with a consumptive with impunity. Now it is well known that in the dried sputum death lurks. Now the conscientious consumptive mother will either separate herself from her dear ones, or exercise the most rigid precaution that no micro-organism be liberated and inhaled by those around her.

The latest message from science along this line is with regard to the common cold. Every one is interested, everyone will read, for every one has colds. Popular prejudice is hard to combat. It will be some little time before we uproot the belief that wet feet and draughts and the legion forms of exposure do not produce colds, but that whenever we "catch"

a cold we have literally caught it from somebody else. So, all along, whenever we said we had "caught" a cold, we were speaking wiser than we know. Thus the man who has "caught" cold becomes at once a source of infection to others, and as a member of the body social, owes a duty to the world to get rid of it without delay.

Of course the superficial, but not the actual, cause of a cold may be the draught or wet feet. Where people shut themselves up in stuffy, ill-ventilated rooms and refuse the sunshine of heaven with healing in its wings, they become so enervated by the vitiated atmosphere that they fall an easy prey to colds and every other physical malady. In this age of enlightenment, they deserve their fate.

Manufacture of Banana Flour.

Now that the United States has acquired large sections of land adapted for raising bananas in Porto Rico, the Hawaiian Islands and probably in the Philippines, it is of interest to us to learn of a new use for this fruit,—the manufacture of flour.

Banana flour is manufactured especially in Central America, Colombia, Venezuela, the East Indies and on the Malayan Islands. The production is very simple. The green bananas are cut up and dried, ground and sifted. The proportion of flour is from 20 to 25 per cent. The main difficulties lie in preserving the yellow color. For this reason the apparatus must be of aluminum or silver as those of iron render the flour black. The banana meal is very nutritious and is not inferior to the best wheat flour.

Encouragement Is Productive of Good Work.

Perhaps there is nothing else so productive of cheerful, helpful service as the expression of approval or praise of work well done, and yet there is nothing so grudgingly, so meagerly given by employers. Many of them seem to think that commendation is demoralizing, and that the voicing of appreciation will lead to listlessness and the withdrawal of energy and interest. This evinces but a poor knowledge of human nature, which is always hungering for approbation; but how mistaken such views are is shown by the loyal and unstinted service given to those large-minded men who treat their employees as members of a family committed to their care.—"Success."

Cotton Silk.

A factory has been started near Aix-la-Chapelle for the manufacture of cotton to resemble silk by a new process. It is a distinct improvement upon the old "mercerized cotton," while another important consideration is the extreme simplicity of the invention. Four hundred hands are to be employed, but as skilled labor is unnecessary, the major part of the employes will be boys and girls, which will considerably cheapen the cost of production. The silk produced by this process is extremely brilliant in color and finish, and possesses great textile strength. The thread consists of ten or twenty fibres twisted into one, but it can also be made of any thickness that may be desired. A thread known as "horsehair artificial silk" may also be produced. This cotton silk is 40 per cent cheaper than the real article. The patent manufacturing rights have been disposed of in France by the inventor for £60,000.—*The Trade Journals' Review*.

Possibilities, Still, for the Inventor.

For every ingenious young American, rich prizes are waiting, not only for great discoveries, but also for little things, simple improvements on the things we have. Whatever occupation he may choose, he will find that that calling is in need of men who can think of something new and better. For the men who have thought of new things, however simple, there have been, in recent years in America, rich material rewards. Such a man was Hayward Augustus Harvey, who recently died a millionaire. His father was the village blacksmith in Jamestown, New York, early in the last century. Harvey saw how slow was the work of forging small things on an anvil, and sought to do it by labor-saving machinery. He became the pioneer in screw machinery and automatic pin machinery. He revolutionized screw-making. The gimlet-pointed screw was his. His last important discovery was the armor-making process which bears his name. He took out seventy-nine patents,—not very many for a life of seventy years, but he did not rush to the Patent Office with every half-conceived idea. No fortune was ever more honestly earned or justly deserved than his. Like many other inventors, he showed his fellow men how to live simply.

Concentrate your mind on the subject of needed inventions for five minutes, and you can think of a dozen things, any one of which would make its inventor rich beyond the dreams of avarice. To give a list of all the inventions that are needed in this year, 1902, would be beyond any man's power, but it is possible to indicate the paths which practical inventors are following. The suggestions here given were gathered by the writer from editors of some of the leading English and American technical journals, from prominent patent solicitors, from manufacturers, scientists, engineers, and workers in many occupations. Each of these hints will, undoubtedly, suggest other needed inventions to imaginative minds.

In the utilization of waste products, in making cheap substitutes for expensive materials, there is an attractive field for the inventor. Rubber, for example, is growing dearer every year. Some success has been had lately in making a rubber-like article from other plants, but a fortune is waiting for the man who will bring forward a real substitute. "Paper is cheap," you may hear a newspaper editor say to the young reporters who crowd too many lines on a page, but the owner of the publication does not think so, when he has to spend a million dollars or more in a year for white paper. Wood-pulp paper is growing more expensive; and the man who makes paper out of some other fiber, at less cost, will not need to worry about his financial future. A company is being formed to make paper from the waste hulls of the cotton seed; nearly every other part of the plant is now utilized. Paving materials are far from perfect. Asphalt is very expensive, and there are

many objections to it. What is wanted is a material that will have all the permanency of asphalt, all the silence of the wood pavements of London, and all the holding qualities of the country macadamized road,—a pavement that will be firm, but soft; that will be smooth, but not slippery; that will last, and yet can be easily renewed; and that, above all else, will be clean. To be a cheap pavement, it ought to be made from some waste material. A fire-proof substitute for wood, made from waste material, will pay its inventor well. Manufacturers are all searching for new materials, and for new and cheaper processes of metal-working. Reduce, by a dollar a ton, the cost of making steel, and you can add enormously to the net earnings of the United States Steel Corporation, which has funds ready to reward the successful inventor. Flexible glass is not impossible. Think what it would be worth to the trades! Mine-owners often leave neglected great mountains of metal because they can not extract the ore profitably.

The invention of all kinds of labor-saving machinery is occupying the attention of inventors all over the world. American inventors set the pace for the world in this field, and that is why we are able to undersell foreigners in the markets of all nations. American manufacturers will pay liberally for tools and machines that will reduce the cost of production. Go into any factory, and you will see work being done by hand that could be done by machinery, and work being done by machinery that ought to be done more rapidly and at less cost. In the development of power, its transmission, and its transformation into heat, light, and electricity, there is an unbounded field of work for the greatest inventive minds. We want cheaper power; we want to catch some of the nine-tenths of the energy we lose in burning coal. We want new fuels. We want more economically operated motors for stationary work, and also for fast locomotion on land and sea.—Franklin J. Forbes, in April "Success."

Artificial Sandstone.

A German firm has produced a new artificial calcareous sandstone, which according to accounts of tests just published, promises excellent results for use in building and paving.

Its method of manufacture is described as follows:—Pieces of burnt lime are thoroughly pulverized in crushers; the powdered lime is then thoroughly mixed with moist sand and after this becomes somewhat dry, it is pressed into the required shapes. These are placed on specially constructed wagons, the several shapes being laid one on top of the other, and carted to the drying ovens. The oven doors are then hermetically sealed and a steam pressure of seven atmospheres put on, which is kept up from 8 to 10 hours, when the stone will be found to be fully hardened—the chalk and stone having formed into silicate. In the first mixing of the materials, by the addition of any kind of color wanted, the necessary tints can be produced in the finished stones so that for decorative effects on the interior and exterior of buildings this process may become very useful.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies for \$1.50.—Please give correct data in ordering.—Address
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Balcony. Window..... D. Butler
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Band brake. Double acting..... A. La France
Bank. Savings..... A. C. Reichel
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Bath tub..... H. Gossmann
Batteries. Apparatus for preparing material, for use in storage..... E. W. Smith
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Battery separator. Storage..... G. M. Willis
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Bearing. Ball..... F. Erdsiek
Bed bottom..... O. G. Franks
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Bicycle support..... H. Burnet
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Blind fastener. Window..... W. Martin
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Boot treeing machine..... A. D. Tyler, Jr.
Boring machine..... R. W. Rowley
Bottle. Non refillable..... C. F. Heath
Bottle stopper. Water..... W. H. Perkins
Bottle washing machine..... C. A. Cole
Bottles, &c. Cleaning device for..... C. M. Thomas
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Brake shoes. Automatic means for regulating..... W. H. Sauvage
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Brick drier..... J. W. Aregood
Bridge. Lifting..... M. Waddell
Broiler..... E. A. Leland
Broom attachment..... M. B. Hughes
Bubble blowing device..... P. D. Horton
Building construction..... C. M. Carnahan
Bullet. Compound..... L. B. Taylor
Bung..... F. Kellers
Butter cutter..... I. B. Walker
Button. Collar..... E. W. Cranston
Button making machine..... W. A. Pendry
Calculator..... A. T. Beauregard
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Car..... P. M. Kling
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Car door fastener..... C. R. Doe
Car draft rigging..... W. H. Emerick
Car draw bar. Ore..... G. E. Traux
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Car gate. Folding railway..... N. H. Colwell
Car haul..... A. M. Acklin
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Card clothing..... C. Mills et al
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Chataleine hook..... L. B. Prahar
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Printing machine wiping device..... W. Fullard
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Screw cutting die head..... P. F. Maines
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Concrete preparing and laying machine..... J. T. Dempsey
Conveyer bucket..... L. A. Brigel, Jr
Conveyer system..... E. W. McKenna
Cord or rope machine..... T. W. Norman
Corn. Apparatus for separating silk from green..... E. Houston
Corset..... 2 pats. D. Kops
Cotton chopper and cultivator..... W. C. Elsey
Couch roll..... H. Parker
Cut-off. Variable..... A. D. & J. H. Gillett
Cutter head extension..... C. E. Hawley
Cycle stand..... C. W. L. Schmidt
Dark room. Portable..... A. Werner
Dental device holder..... J. A. Mead
Derrick and hoisting mechanism. Hoisting..... A. Zastrow
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Diamonds. Cutting..... J. H. G. Sturman
Display rack..... W. A. H. Winter
Door hanger..... G. Wildeman
Door. Warehouse..... W. A. Cross
Draft equalizer..... J. J. Cox
Draft equalizer..... A. Cogswell
Drain hopper. Slop..... H. H. Kendrick
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Drinking cup and shaving mug. Combined traveler's..... F. Finley
Dump shovel. Hand..... J. Felton
Ear protector..... E. E. Kistler
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Electric current induction motors. Device for starting alternating..... K. A. Lindstrom
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Electric wire conduit..... E. D. & H. N. Speer
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Elevator safety device..... H. Rowntree
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Faucet or cock..... A. Clarkson
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Firearm. Breech loading..... F. Snyder
Fire escape..... J. Frenzel
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Gold separator..... A. L. Dana
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Harrow disk journal..... O. E. Johnston
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Heating boiler. Steam or water..... J. Kuen et al
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 Railway switch. Street. W. J. Bell
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 Railway track structure. H. B. Nichols
 Railway, tramway, &c. J. Brown
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 Razor hones. Automatic oscillating skid or support for. T. Anderson
 Razor. Safety. J. H. Becker
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 Releasing trap. G. N. Portman
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 Rice hulling and polishing machine. W. Van Houten et al
 Rod coiling apparatus. W. D. De Lamar et al
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 Rolling pin, potato masher, & biscuit cutter. Combined. H. L. Meyer
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 Shirt. S. Butz
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 Shoe. Marsh. W. D. Kelsey
 Shoe polishing apparatus. N. C. Spring
 Shoe tree. G. F. Dunn
 Show card pin fastener. L. Lemos
 Shuffle board. H. Vaughan
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 Signal recording mechanism. G. J. Schoeffel et al
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 Stave column. J. S. Miller
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 Telephone exchange switchboard system. W. S. Paca
 Telephone exchange system. W. S. Paca
 Telephone transmitter sanitary shield. J. B. Taveron
 Thermo electric alarm. H. Black
 Thill coupling. C. C. Bradley
 Thread holder for spools. D. Gamble
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 Time recorder. W. P. Gurr
 Tire clamping device. Vehicle wheel. J. D. Prescott
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 Tire setting machines. Device for bringing together the ends of solid rubber tires in. J. A. Burrows
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 Tobacco pipe. P. M. Olson
 Tobacco stemming machine. A. J. Bush
 Toilet rooms. Device for cleaning and disinfecting the seats in. J. & E. von Stryk

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 Tooth crown and making same. Artificial. E. Nagy
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 Trousers leg protecting attachment. B. F. Salmon
 Truck bolster. R. V. Sage
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 Dental instrument cabinet. F. E. Case
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 Pin blank. Stick. H. R. Steele
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 Boring holes in rock, &c. Apparatus for. F. H. Davis
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 Concrete. Coupling metal bars in reinforced. E. L. Ransome
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 Firearm sighting device. W. Youtlen
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 Fire escape and convertible scaffolding. Telescopic. W. E. Monroe
 Fire resisting partition, wall, &c. W. Seefels
 Fireproof construction. P. B. Brandstedt
 Fireproof flooring. J. B. Hinchman
 Flier. F. A. Meller
 Flier. J. J. McOsker
 Flushing apparatus. P. F. Glackin
 Flushing tank. Automatic. P. F. Glackin
 Forging machine. S. Vanstone
 Framing or other purposes. Ornamental stock for. J. H. Killion
 Fuse cut out. Plural. C. J. Dorsey
 Game. G. W. Winckfield
 Game apparatus. D. Smith
 Game table cushion. R. F. Downey
 Gas burner. Bunsen. B. M. Hanna
 Gas burner. Incandescent. C. A. Blumh
 Gas engine. H. Junkers
 Gas engine. S. A. Freeman et al
 Gas generator. Acetylene. L. T. Stephenson
 Gas generator. Acetylene. J. Harris
 Gas igniter. T. B. Wilcox
 Gas retort stand pipes. Apparatus for cleaning. J. H. Taussig
 Gear. Speed changing. G. E. McElroy
 Gearing. A. T. Brown
 Glass articles. Manufacture of hollow. P. T. Sievert
 Glass flattening and annealing apparatus. J. A. Anderson et al
 Gold from refractory ores. Recovering. H. R. Cassel
 Grading machine. T. R. McKnight
 Grain cleaner. A. D. & G. L. Francoeur
 Grain drill. A. Smith
 Grain drill. A. Armitage
 Grain shocking machine. T. A. Wooley et al
 Grain tube cup. W. C. Renaker
 Grate bar. J. Barker
 Grinder. Mowing machine knife. F. G. Greene
 Grinding machine. Cultery. A. Johnston
 Gun barrel. W. F. Cole
 Gun. Breech loading. G. S. Lewis
 Gun. Rapid fire. G. J. Boehm
 Guns. Firing multishot. R. W. Scott
 Gymnastics. Combination apparatus for heavy. H. Suder
 Hair c asp. J. Machado
 Halter. G. P. Cooley
 Hammer. Automatic. A. Stromdahl
 Harrow and cultivator. Reversible rotary. M. Schichtl
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 Hat pressing machine. C. H. Klinger et al
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 Heel nailing machine. F. F. Raymond, 2d
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 Hinge. Water-closet-seat. P. F. Clackin
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 Hitching device. Horse. D. T. Granbery
 Hoist. Self-dumping. F. L. Ransome
 Hoisting and conveying apparatus. H. H. Guffin
 Hoisting and dumping apparatus. Tramway for. G. D. Johnstone
 Hook and eye. A. McNicol
 Horseshoe. J. R. Holland
 Horseshoe-calk. B. McKenzie
 Horses from vehicles. Device for clearing. L. L. & J. W. Fox
 Hose-nozzle. J. E. Garrison
 Incandescent-mantel support. J. F. Bredow

Ingot. Compound.....S. A. Cosgrave
Ingot or billet heating furnace.....J. B. Nau
Ingots and mold therefor. Manufacture of compound.....S. A. Cosgrave
Insect-destroyer.....R. A. McCrone
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Ironing-table.....E. Fisk
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Jewelry. Setting for finger-rings or other articles of.....C. T. Wittstein
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Knitting-machine yarn-changing mechanism. Circular.....W. P. Young
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Labeling-machine.....E. N. Gillfillan et al
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Lamp.....W. J. Smart
Lamp-burner attachment.....H. L. Hills
Lamp. Electric-arc.....M. S. Okun
Lamp incandescent gas.....W. Tice
Last. Darning.....A. E. Macdonald
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Linotype justifying device.....J. R. Rogers
Linotype-machine matrix.....J. R. Rogers
Liquid-dispensing apparatus.....W. & W. Hucks, Jr
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Loom stop-motion.....N. & G. Fortier
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Lubricator.....B. T. McCanna et al
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Manhole-cover.....F. Barker
Match-box.....K. Halfacre
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Music-rack.....J. H. Stanfield
Music-roll for automatic musical instruments.....P. Welin
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Oil-cup. Shaft-bearing.....F. E. Bocorselski
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Padlock.....J. J. Cotter
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Paper-box corner stay.....H. B. Smith
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Paper-making machine.....J. W. Moore et al
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Paper size. Rosin soap for.....H. F. Chappell
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Rail-fastener.....E. W. Hogan
Rail-joint.....J. W. Kennedy
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Railway joint.....J. L. Mayes
Railway. Marine.....J. L. Crandall
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Railway structures. Device for reducing the noise in elevated.....H. G. Farr
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Rolling metal forms. Machine for.....C. F. Brooker
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Smoothing iron. Vapor heated.....W. Mitchell
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Spring wirework.....H. R. Kuersten
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Steam boiler.....reissue.....C. B. Rearick
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Steering gear.....R. E. Sack
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Street sweeping machine.....W. G. Dingle
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Studding or partition. Metal.....P. Brandstedt
Submarine permanent way.....K. Leps
Sugar drying apparatus.....F. Mahoudeau
Suspender fastener.....A. S. Henshaw
Switch operating device. Automatic.....G. G. Guenther
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Tablet making machine.....S. C. Gurley
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Tag-fastener.....S. G. Spencer
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Tea leaves. Withering.....C. U. Shepard
Telegraphy.....J. P. Gorton
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Tree stand or support.....G. Kachold
Tree-transplanter.....G. G. Guenther
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Truss. Hernial.....R. Arnold
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Tympan. Running or shifting.....H. F. Bechman
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Type writing machine.....P. T. Dodge
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Umbrella support.....A. J. Pfleger
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Valve for engines and motors. Steam actuated.....W. A. Woodson
Valve gear. Engine.....R. O. Hood
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Valve. Stop.....J. Walsh, Jr
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Wood pipe machine.....A. Anderson
Woodworking machine guard.....2 pats.....A. Cook
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Plate, &c.....C. J. Ahrenfeldt
Plate, &c.....C. E. Haviland
Register. Side wall.....2 pats.....G. Auer
Spoons, forks, &c. Handle for.....W. C. Codman
Teapot, &c.....C. E. Haviland

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Can filling machine.....C. H. Ayars
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Electric brake.....F. E. Case
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Railway block system.....B. C. Rowell
Railway carriage couplings. Engaging or disengaging device for automatic.....C. Barovits
Railway crossing.....J. H. Higgins
Railway signal.....J. H. Clark
Railway signal.....E. McMahon
Railway signaling. Electric.....O. W. Hart
Railway sleeper made of metal and wood.....N. Devaux et al
Railway tie. Metallic.....V. E. Barnes
Railways. Displacing device for use on.....G. Vogt
Reamer.....W. Jackmond
Reclining chair.....F. Rose
Robe. Invalid's.....A. Schermerhorn
Rocking chair. Platform.....J. A. Zeinwoldt
Rolling stock.....J. A. Burns
Roofs or other surfaces and fastening device therefor. Sheet metal covering for.....G. T. Williams
Rotary cutter holder.....C. G. Belmer
Rotary motor.....L. E. Troxler
Rug or garment fastener.....W. S. Richardson
Ruling plain paper. Pen or pencil attachment for spacing lines in.....E. Krauss
Sack holder.....H. M. Lillo et al
Sack. Ore or grain.....W. R. Morris
Sad iron. Gas heated.....D. R. Blair
Sample register.....P. Olson
Sap spout.....D. Rudd
Sash lock.....H. H. Kendrick
Screen plate fastener.....M. E. Wilkinson
Scrubbing machine.....J. A. Nelson
Seal for jugs or bottles.....J. P. Dant
Seal lock.....T. S. Wheelwright
Sealed receptacle.....H. C. Osborn
Seaming metal cans. Apparatus for side.....G. Wilcox
Seaming metal cans. Side.....G. Wilcox
Seed. Hulling cotton.....J. McFarlane et al
Seed. Hulling cotton.....J. McFarlane et al
Seed kernels from their hulls and lint. Means for separating cotton.....J. McFarlane et al
Seeding machine.....W. A. Van Brunt
Setting instrument.....M. Chamberlain
Sewing machine. Cylinder.....L. Onderdonk
Sewing machine tension device.....R. Pierpont
Sewing machine treadle rocker attachment.....F. P. Harris
Sewing machine tucker.....R. J. Kelley
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Shade and curtain fixture. Adjustable.....C. S. Myers
Shade or curtain hanger. Window.....F. Wuest
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Sifters. Cloth cleaning attachment for gyratory.....T. Scott
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Signals automatically at level crossings, &c. Means for operating.....L. Semat
Signaling mechanism.....R. Herman
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Siphon cleaning or polishing apparatus.....S. Munckton
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Sluice gate operating mechanism.....W. J. Ritchie
Smelting furnace. Reverberatory.....F. Nevegold
Snap. Plow line.....W. L. Peterson
Soda water fountain.....P. De Lacy
Soldier to sheet metal blanks. Machine for applying.....G. Wilcox
Soldering machine. Can.....G. Wilcox
Soldering pliers. Crown.....F. E. Roach
Sound producing instruments. Means for regulating the tension of diaphragms of.....J. F. Luscomb
Spectacle or eyeglass nosepiece.....I. Fox
Speed and reversing mechanism. Differential.....W. Diebel
Speed regulator.....N. Lombard
Spice extractor.....J. W. Pitts
Spinning frame protector. Ring.....J. C. Wall et al
Spoke cutter and beveler.....W. H. Exley
Stamp pad.....C. B. Woody
Steam boiler. Water tube.....C. B. Rearick
Steam engine.....K. Fitzpatrick
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Stoves. Air mixer and heater for gas burners for blast furnace.....C. H. Bjorckner
Strainer.....M. Warner
Sugar. Converting cellulose into. A. Classen
Sugar. Recovering.....A. Wohl et al
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Telegraph. Signal.....E. & E. J. Lavens
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Thermostat.....G. R. Sherman
Tile floor.....R. L. Moyle
(Continued in May Number.)

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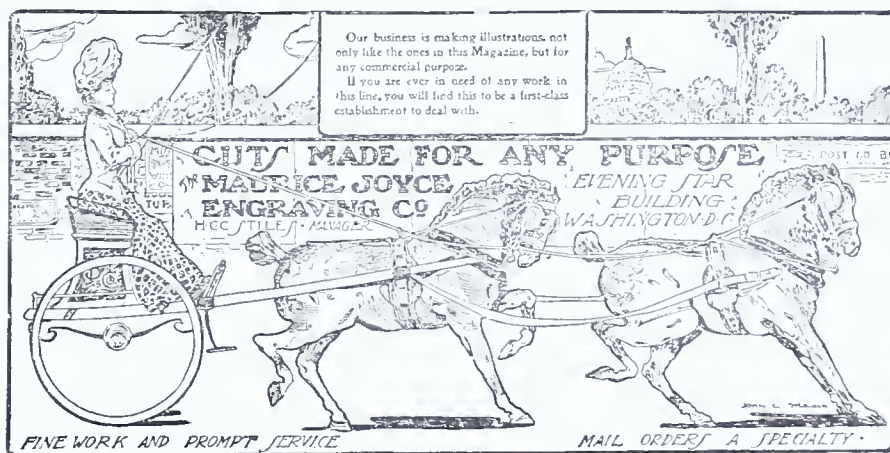
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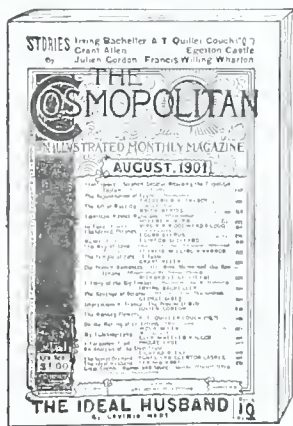
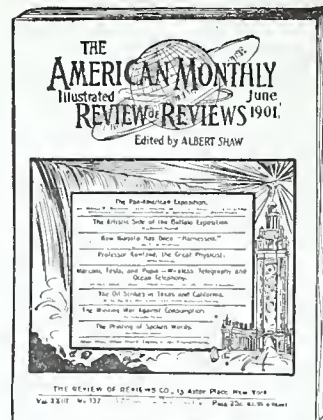
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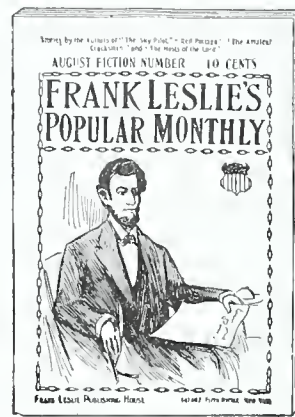
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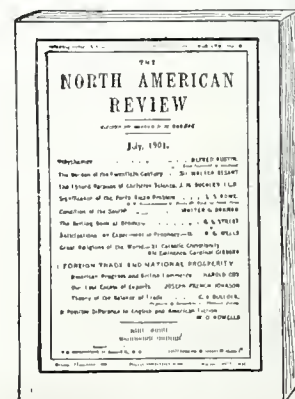
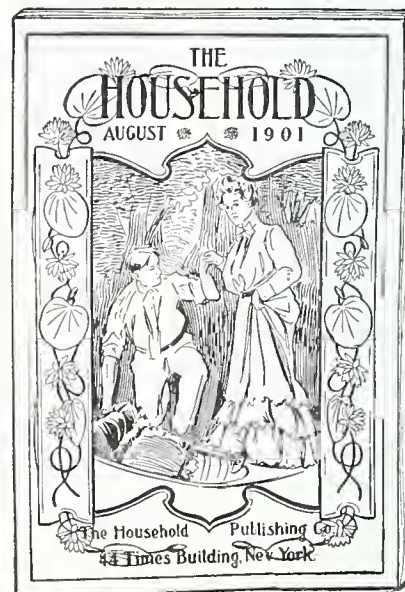
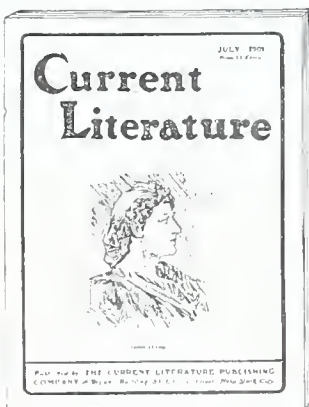
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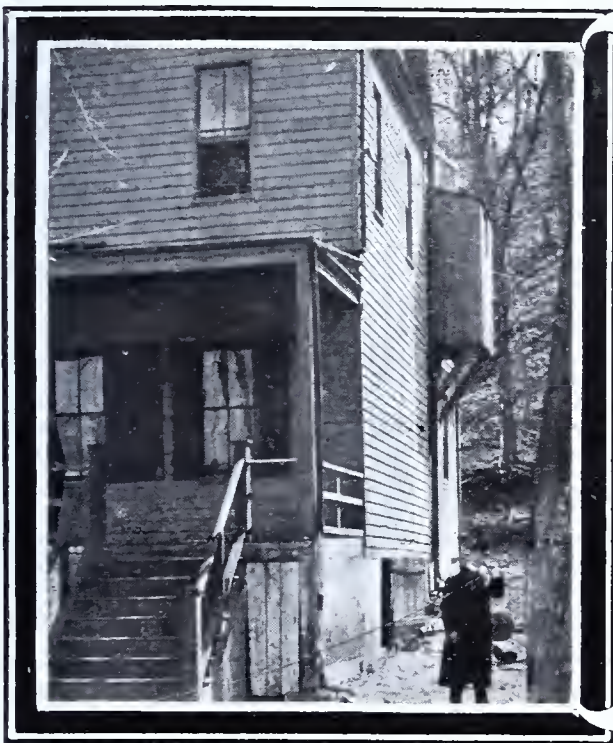
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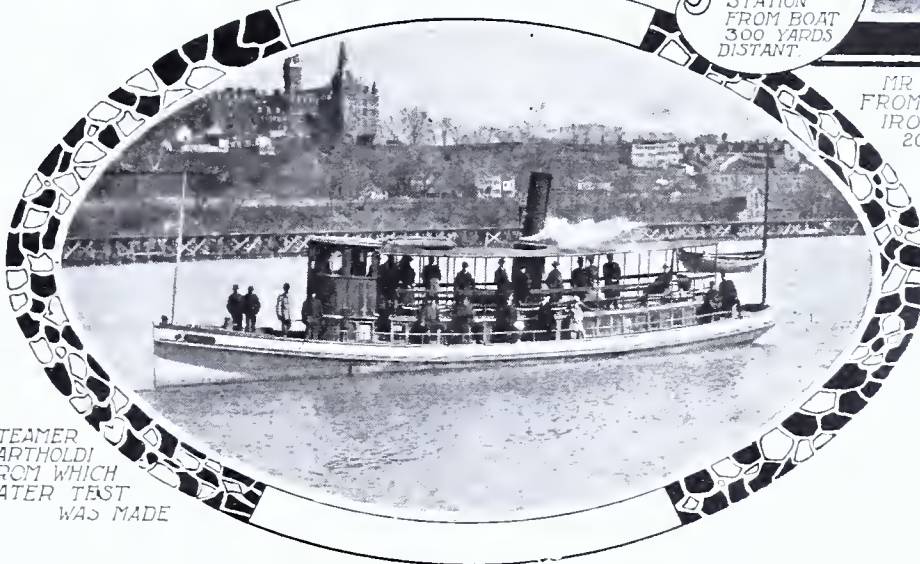
SHORE STATION
RECEIVER AND TRANSMITTER
IN SECOND STORY WINDOW.



MR.
STUBBLEFIELD
TALKING TO
SHORE
STATION
FROM BOAT
300 YARDS
DISTANT.



MR. STUBBLEFIELD GIVING A LAND TEST 1/2 MILE
FROM STATION SHOWING RECEIVER BETWEEN TWO
IRON RODS STUCK IN THE GROUND SUPPORTING
20 FOOT WIRE.



STEAMER
BARTHOLDI
FROM WHICH
WATER TEST
WAS MADE

THE remarkable scientific achievements of the nineteenth century have been eclipsed while the twentieth century is yet in its infancy. The world has hardly recovered from the startling announcement that Marconi has demonstrated the possibility of girdling the globe with a system of wireless telegraphy, when an American inventor, unheralded and modest, comes forward and shows that he is able to transmit speech for great distances without wires.

Mr. Nathan Stubblefield, of Murray, Ky., the inventor of wireless telephony, came to Washington some time ago for

the purpose of securing patent protection on his invention, and while here, conducted a public test in the presence of a number of scientists and capitalists from New York and Chicago. The steamer Bartholdi was chartered for the occasion, and was fitted up with transmitting and receiving apparatus, including an ordinary telephone transmitter and receiver, a small wooden box (possibly a foot square), and wires extending from the box and trailing in the water at the stern of the steamer. After consulting his attorney, E. G. Siggers, Esq., of Washington, Mr.

Stubblefield declined to describe the contents of the box in detail, but it was generally understood to contain batteries and induction coils, constructed and arranged in a novel manner in accordance with Mr. Stubblefield's invention.

The party boarded the Bartholdi in the morning, and after President Gerald Fennell, of the Gordon Telephone Company, had explained briefly the nature of the tests to be made, the steamer proceeded up the historic Potomac River to the palisades, opposite the Georgetown University and a mile or more above the city. A landing was made on the Virginia shore, and the party proceeded to an inn where a shore station had been previously installed. In a second-story room was found a second "mysterious box" apparently identical with the one on the steamer, another ordinary receiving and transmitting set, and wires which extended through an open window and terminated at the water's edge.

THE WATER TEST.

Several members of the party remained at the shore station, and the steamer proceeded several hundred yards from the shore. A number of additional receivers were connected with the wires on the boat by Mr. Stubblefield, and the boat's whistle was blown as a signal that all was in readiness for the water test. In an instant all conversation ceased, and every nerve was strained to catch the first words to be transmitted through space without wires. The boat circled about in mid-stream, and the signals were impatiently repeated at brief intervals, but to no purpose. The spell was broken; the breathless interest of the party gave place to skeptical smiles, and the ominous "I-told-you-so," voiced a general disbelief in modern miracles. The inventor himself was the least concerned of all. He declined a proffered receiver, and ordered the steamer back to the land station, where it was found that through some misunderstanding the signals had not been noticed and no attempt had been made to communicate with the boat.

The steamer again proceeded to the middle of the river, and immediately after the sounding of the whistle, Mr. J. Waldmere Kirk, of New York, announced that he could faintly hear a voice. This was quickly followed by delighted exclamations from others of the party, and several announced their ability to distinguish words and short sentences. Then followed the familiar strains of "The Georgia Camp Meeting," "Home Sweet Home," and other melodies which were distinctly heard and easily recognized. The transmission of the musical sounds came in the nature of a surprise. It was afterwards learned that one of the gentlemen at the land station, Mr. C. F. Coggeshall of New York had produced a harmonica. This proved to be a most fortunate incident, because the strains of music could be heard at distances too great for the clear transmission of speech, although the sharp tones of a voice counting could be heard at distances nearly as great.

By this time even the more skeptical

of the party were becoming impressed with the wonderful nature of the discovery and the limitless possibilities of this latest product of inventive genius. While the transmitted speech could not be heard as distinctly as through the ordinary telephone, it had at least been demonstrated that conversation could be carried on between remote points without the aid of wires or other artificial conductors.

THE LAND TEST.

The party was now landed at the shore station and divided into a number of groups. Each group was given a receiving apparatus consisting of a single strand of ordinary insulated telephone wire, at the middle of which was connected an ordinary receiver. To the ends of this wire were attached iron rods, fitted at their upper ends with polished metal spheres into which the wire extended.

Each group, equipped with one of these receiving sets, as they were termed by the inventor, proceeded in different directions from the shore station, one of the groups climbing the bluffs to a point above the inn and several hundred yards distant therefrom, and another traversing the line of the shore to a similar or perhaps greater distance from the transmitting apparatus. The metal rods at the ends of the receiving wire were sunk in the soft ground to a depth of from 12 to 18 inches, and the members of the party took turns at the receiver.

The results of the land test were far more satisfactory than those of the water test. Not only could the strains of the harmonica be distinctly heard at great distances, but a voice could likewise be distinguished, counting and conversing in a manner which was truly marvelous. During the land test, the receivers were connected to the ground entirely out of sight of the inn, great boulders, trees and an outbuilding or barn were interposed between the receiving and transmitting stations. The intervention of these solid bodies, however, seemed not to interfere in the least with the transmission of sound. It was explained by Mr. Stubblefield that the varying of the electrical potential of the current at the transmitting station by the vibration of the diaphragm of the transmitter, produced a disturbance in the magnetic field of the earth, which in turn effected a corresponding vibration of the receiver, just as the electrical undulations passing through the wires of an ordinary telephone system effect the vibration of its receiver. A stone wall will, therefore, oppose no resistance whatever to the transmission of sounds, provided the ends of the receiving wire are properly grounded. This fact was demonstrated by pulling the iron rods from the earth. Nothing whatever could be heard, but as soon as they were again grounded, the strains of the music and the sound of voices were distinctly audible.

ANOTHER WONDERFUL INVENTION.

During his experiments Mr. Stubblefield has discovered a method whereby the use of insulation for submarine cables may be avoided. This he calls his "bare wire" system.

An uninsulated iron wire was laid along the shore for nearly a mile. For a greater portion of the distance the wire was under water, but it was also led both through and over the ground, over rocks, and around trees. It is ordinarily supposed that the dissipation or leakage of the current under these conditions would render the use of a bare wire impossible; and such indeed would be the case under ordinary circumstances. By a peculiar arrangement of his terminals, however, the inventor is able to prevent any material loss of the current. This was clearly demonstrated by the test. Several of the party remained at the transmitting station, and the others

proceeded nearly to the extreme end of the wire to which a receiver had been connected. In this test, sounds were transmitted over the bare wire, and the voice was heard as distinctly, or perhaps more so, than with the ordinary telephone systems.

Mr. Fennell stated that the Gordon Telephone Co., of Charleston, S. C., would at once install the Stubblefield system in Charleston, and would therefore be the first telephone company in the world to adopt wireless telephony, which marks the latest and most important development in the art of speech transmission. He also stated that the submarine cables controlled by his company and extending to the Sea Islands off the coast of North Carolina, will be at once displaced by the Stubblefield bare cable system. An ordinary insulated cable is said to cost from three to five hundred dollars a mile, and to require constant outlay for maintenance. The Stubblefield cable will cost less than one-tenth of the amount stated, and the expense of maintenance will be practically nothing.

WILL NEWSPAPERS BE SUPERSEDED?

The Gordon Telephone Co., has under consideration a novel proposition.

The magnetic disturbances induced at the transmitting station of Mr. Stubblefield's wireless system will manifestly be transmitted alike in all directions. It has therefore been proposed to disseminate news simultaneously from a central transmitting or news station to a large number of subscribers, each having a receiving set. In the use of this system, the operator at the news station would transmit to the subscribers at stated intervals the news received from all parts of the country, these verbal bulletins furnishing the news almost as soon as received and supplying at nominal cost the place of a newspaper. In certain parts of Europe, this system is in use with the ordinary telephonic instruments.

MR. STUBBLEFIELD'S PERSONALITY.

Mr. Stubblefield, whose picture appears in the accompanying cuts, is a typical inventor. He is modest and unassuming, but is absorbed in his scientific work. The public tests, which have brought his wonderful genius to the attention of the world, are but the culmination of years of untiring effort.

He expressed himself as being far from satisfied with the result of the public exhibition, and Mr. Fennell corroborated his statement that messages were freely transmitted and received between stations approximately six hundred yards apart, during a private test at the home of Mr. Stubblefield near Murray, Ky.

It is evident that the practical use of this system of wireless telephony depends only upon the power and delicacy of the apparatus employed. The demonstrated fact that articulate sounds can be clearly transmitted for a distance of several hundred yards, by means of the crude experimental apparatus employed during these tests, would appear to be conclusive that an American inventor has solved the problem of wireless telephony, and that the question of distance will be effectually answered by the production of properly constructed apparatus.

Among those who witnessed the tests were President Gerald Fennell, of the Gordon Telephone Co. of Charleston, S. C., and Mrs. Fennell; E. G. Siggers, of Washington, D. C., the attorney representing Mr. Stubblefield before the Patent Office; Louis G. Julihn, who is associated with Mr. Siggers, Reginald Fennell, Supt. of the Gordon Co.; Henry Clay Fish, President of the American Butter Co.; Charles B. Brown, of the Fidelity Insurance Co.; J. Waldmere Kirk, and Mr. and Mrs. C. F. Coggeshall, all of New York; Alonzo K. Smith, of Chicago; Mrs. Rose A. Ingalls and Miss Iowne Ingalls, of Louisville, Ky.; and members of the press.

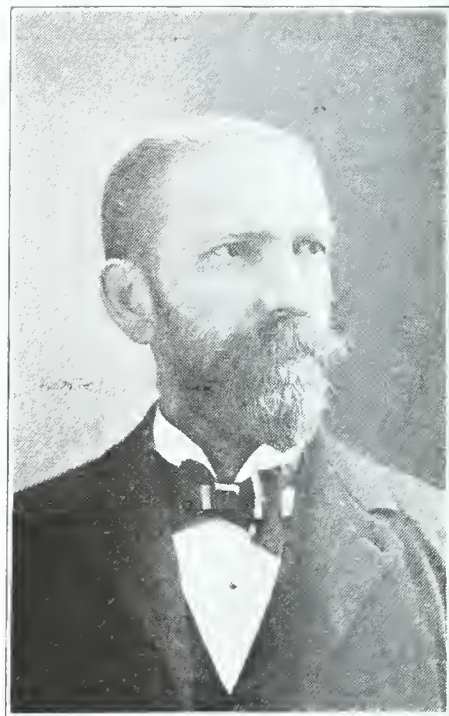
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DIVISION XXIII.

Horology, Acoustics, Registers, Recorders, and Electric Signals.

HOROLOGY.

THERE were three well defined primitive forms of time keeping instruments—the sun-dial, the clepsydra or water clock, and the graduated candle. Authorities disagree as to which was first invented. Isolated references in the earliest literature give us the only knowledge we now possess. The Old Testament mentions the King Ahaz dial, and we can only infer that it consisted of something like a staff or pillar so exposed to the sun as to cast a shadow on a dial with some form of graduations thereon. From the various references to sun dials in Greek and Roman literature, we can assume that considerable ingenuity was displayed in arranging the dials of the sun-dial to indicate the correct time of day at various seasons of the year. But at best the sun dial was necessarily insufficient. It could only be used when



MR. JAMES T. NEWTON.

the sun was shining. On cloudy days, or at night, other means were necessary to properly measure the time, and we can imagine that resort was had to such devices as the hour glass, clepsydra, and the graduated candle or stick.

The most primitive clepsydra was probably an earthen or wooden bowl with a small orifice therein. If such a bowl were graduated and placed in a larger vessel of water, it would crudely measure the time it would take for the water to run into the bowl and to rise to the various graduations. This crude clepsydra was developed into a cylinder with a loosely fitting piston having a graduated rod, and as the water was allowed to run into the cylinder through a small orifice, it gradually raised the piston and rod, and one could read the successive graduations on the piston rod as they rose above the top of the cylinder. Probably the next step in the evolution of the clock from the clepsydra was to

put a rack upon the piston rod, and with a pinion working with the rack and the pinion carrying a hand moving over a dial, one could read on the dial the height that the inrunning water had raised the piston. The evolution from the water-actuated dial and hand, to the spring or weight and the pendulum-actuated clock can only be indefinitely traced, but it will be observed that the old clepsydra can be analyzed into the same elements as the modern clock, namely: a motor, a governor or regulator, and an indicator. As in the clock, the weight or spring is the motor, the pendulum or balance wheel, the regulator, and the dial and hand the indicator, so in the clepsydra the water was the motor, the orifice the regulator, and the graduations the indicator.

The evolution of no class of machines has been so closely related to the advance in civilization, as has been the evolution of time keepers. Civilization is marked at every step of its progress by an increase in the inter-relations of man with man, and since the importance of time is thus enhanced, it has been said that the accuracy with which time is observed in ordinary life affords one of the best indications of the social conditions of a people. Hence we find today in thousands of offices all over our land, clocks connected by telegraph and telephone lines directly with our Naval Observatory, so that although our clocks may not be perfect time keepers, at the moment of 12 o'clock, there comes a stroke on a little bell and simultaneously, the three hands—hour, minute, and second—whether the clock gains or loses during the preceding 24 hours, fly to their proper positions. At the same moment, and controlled by the same impulse ball, all the ships in all the harbors from New York to San Francisco, have their chronometers synchronized. The same signal is sent to all the railroad offices, and determines the starting, stopping and speed of trains on every railroad in the country.

The greatest advance, however, in recent years, in clock and watch manufacture, has been in the automatic machines for making the various parts, rather than in the clocks or watches themselves; although American chronometers rank among the best made, and have been made so accurate as to vary less than a second a month the year round. American clocks and watches, too, now rank with those skilled in this art, as high or higher than the same priced Swiss or foreign clocks or watches, a result only rendered possible by reason of the automatic machines used to cut out, shape, and make with a nicety, unattainable by human hands, the delicate mechanisms of the timepiece. If this work had to be done with the high-priced manual workmanship of American workmen, American watches and clocks could not be sold for five times their present value. About 4,000 patents have been granted upon devices of this class.

ACOUSTICS.

The acoustical art includes, besides sound-locating instruments, mechanical telephones, auricles, etc., graphophones or phonographs, gramophones and telegraphones.

While sound waves had been long before traced and their variable delineations preserved, it was not until 1877 that sound waves were recorded upon impressionable material and reproduced. Up to that time many efforts had been made to reproduce human speech. Mechanisms had been constructed resembling, as near as possible, the human voice organs, but such devices reproduced the human voice with poor success. Mr. Edison in 1877, conceived the idea of recording upon tin foil by means of a point attached to a vibrating diaphragm the vibrations in sound waves; then by running the tin foil back over the same point and the same diaphragm, there would be reproduced the original sound. This was the embryonic phonograph. It was imperfect, because the needle or point only indented or

duction. And attempts have been made to produce such records by impressing softened celluloid upon electrolytically produced matrices, and then chilling the records to case-harden them. Inventors have also striven for years to obviate what is called the *metallic* sound, that accompanies all reproduced sounds on the talking machine, but this so-called *metallic* sound is probably caused by the absence of the overtones that ordinarily accompany every human sound. No talking machine has ever, as yet, been so delicately constructed as to record these delicate overtones, and until some way is found to overcome the inertia of all the parts, and a perfectly soft record material is discovered, the metallic or harsh tones will probably always accompany the talking machine reproductions.

the magnetized tape or wire is run back under the magnet and diaphragm, the original sound is produced.

REGISTERS.

The abacus, used in ancient times by the Greeks and Romans, and still used by the Chinese and Japanese, shows the disposition to perform arithmetical computations by mechanical means. The first efforts to make more complicated calculating machines appear to have been made by scientific men as a means for making the elaborate calculations required by astronomers, and for computing tables. Some of the machines designed for this purpose were exceedingly complex, and so costly that the aid of the government was invoked to pay the expense of producing them. The machines at present in use for this purpose are chiefly merely adding machines, but subtraction,



DIVISION XXIII OF U. S. PATENT OFFICE.

squeezed to one side the particles of tin foil, which left a record which when viewed under the microscope was found to be rough and jagged. In 1886, Messrs. Bell and Taunter produced a record by *cutting*, as contradistinguished from *indenting*. This record was cut in a soap-like composition and was the foundation of many subsequent improvements. In both the *Graphophone* and *Phonograph* the record is produced by a movement of the recording stylus in a direction perpendicular, or up and down, with relation to the record surface. In the *gramophone* the recording stylus moves laterally or sidewise instead of up and down. The trend of invention in both graphophones and gramophones lately has been to produce hard smooth-surfaced records, thus obviating the hissing sounds accompanying the repro-

duction. It has recently been found that when a record is made to travel very fast, the reproductions are much louder and clearer than when the record moves slowly. Upon this principle, a device has been constructed and is known on the market as the *Graphophone Grand*.

Mr. Poulsen, a Danish inventor, has recently patented a curious instrument for reproducing human sounds and is known as the *Telegraphone*. This device reproduces sounds by electromagnetic action upon a steel record surface. The steel tape or wire is wound from one spool on to another, and thus drawn closely over an ordinary small magnet attached to a diaphragm, which, when it vibrates in accordance with sound, moves the magnet towards and away from the moving tape or wire, thus magnetizing the tape or wire in spots. Then when

tion, multiplication, and division can be performed on them by proper manipulation. These operations are performed with far greater ease, speed and accuracy on the machines than by the mental process. The most extensive users of adding machines, however, are the book-keepers of banks and other mercantile houses. The long columns of figures they have to deal with are added very rapidly and with unflinching accuracy by the machine, which prints the figures in a column and automatically prints the correct sum at the bottom.

The familiar fare registers, in use in all street-cars, and cash registers, now used by most store-keepers, are designed to put a check on careless or dishonest employees, and to assist in keeping the accounts of businesses where a number of employees have to receive money from customers. A

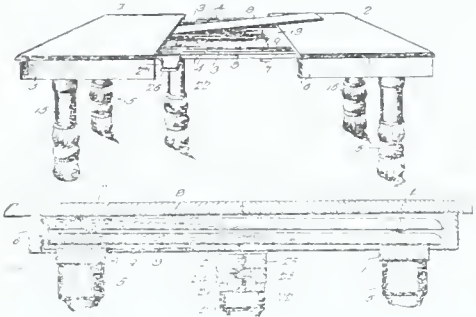
Continued on page twelve.

CLEVER NEW PATENTS.

Extension Table.—Cultivator Plow.—Cotton Seed Delinting Machine.—Churn.—Bed Spring.—Sap Spout.

Extension Table.

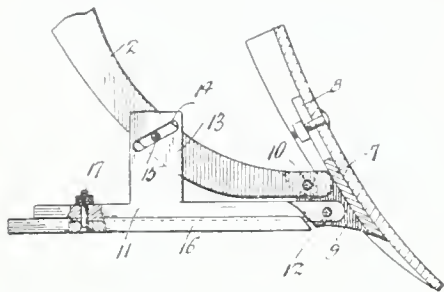
Another interesting invention that has passed the scrutiny of the Patent Office, is an extension table, the invention of Joseph Cornell, of Earlville, N. Y., whose aim is to provide a structure which will constitute a receptacle for the removable leaves when not in use.



The general outline of the table is the same as that ordinarily employed, comprising two end sections connected by slides and movable toward and from each other, the space between these sections being adapted to receive removable leaves. These leaves, when not in use, are arranged beneath the top in receptacles formed for that purpose. To this end, cross bars are arranged beneath the top and are connected by side and central longitudinal bars that divide the space into separate compartments adapted to receive the leaves, which are inserted as shown in the cut through the space between the adjacent edges of the end sections.

Cultivator Plow.

For a long time farmers have wanted a shovel plow, the shoe or point of which could be adjusted to different inclinations as desired without difficulty. Mr. Milton M. Ritch, of Laurinburg, N. C., has invented one that fulfils all the requirements, and he has obtained a patent on the same. This patent will be exploited by Mr. Ritch and Mr. Mark Morgan of Laurel Hill, N. C., who has purchased a one-half interest in the same. We herewith present a sectional view of the plow which fully illustrates the construction. The usual shovel standard 2 is employed, and to its lower end is pivoted a shoe 7 which carries the blade

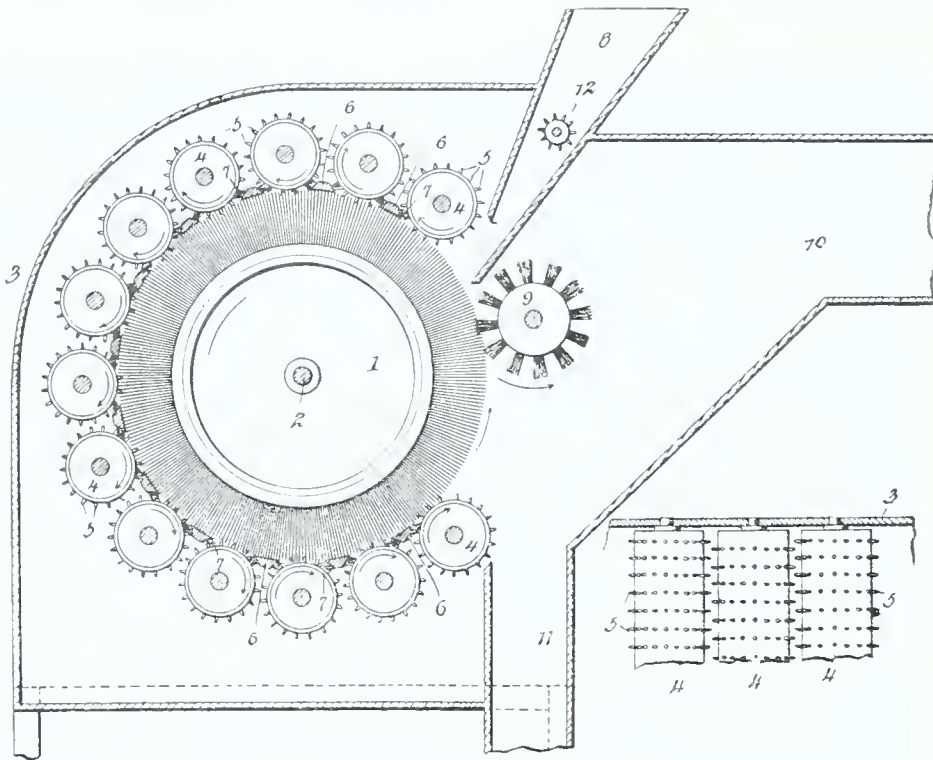


or point. A longitudinally movable bar 11 is also pivoted to this shoe and has an upstanding projection 13 that extends alongside of the standard 2. This projection is provided with an inclined slot through which is passed a bolt 15 that also passes through the standard. With this arrangement it will be seen that by loosening the bolt 15 and moving the bar 11, the shovel may be inclined to any degree desired, and held in any position by retightening the bolt.

Cotton Seed Delinting Machine.

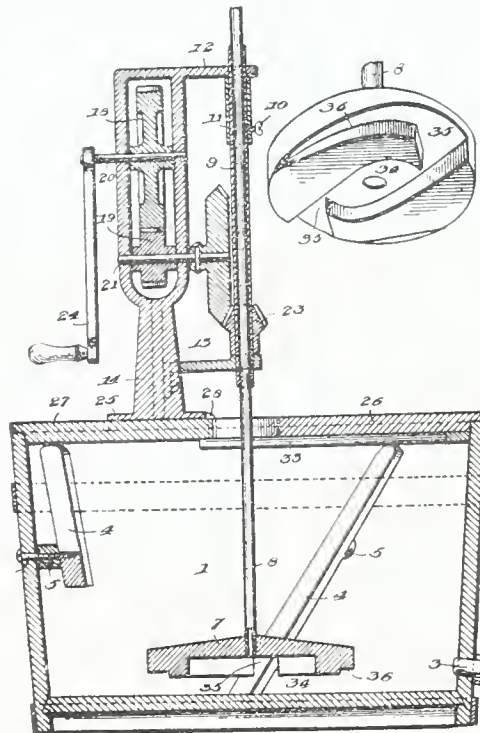
A delinting machine along novel lines that will interest cotton people has been patented by John Kasmeier, of Florence, Alabama. The accompanying cut clearly shows the general arrangement of the machine. A casing 3 is employed, having an inlet hopper 8 at its upper end, a seed-discharging spout 11 in the lower end, and a lint flue 10 leading from one side. Within this casing is arranged a large delinting brush 1 that is fixed to a shaft 2, and around this brush are placed a number of toothed rollers 4 that extend from the inlet hopper to the seed-discharge. A doffing brush 9 is also located within the casing beneath and behind the hopper, and directly over the seed-discharge spout. The rollers

and brush are so connected that the brush will revolve at a high rate of speed, while the rollers will rotate at a comparatively slow speed. The cotton seed is fed through the hopper 8 and will be carried by the brush between the rollers, which rollers will constantly revolve the seed, while the brush will remove the lint. When the seed has passed the last roller, it will drop through the spout 11, while the lint will be removed by the brush 9. This brush also revolves at a rapid rate, thereby causing a current of air to flow out through the flue 10, the lint passing with this current of air out of the machine. Between the rollers are arranged cross bars 6, which hold the seed to the brush, these bars having brushes on their opposite faces which are in engagement with the rollers.



Churn.

To the farmers who make their own butter, the churn recently invented by Mr. Newton Monday, of Plattsburg, Mo., will attract attention. Mr.



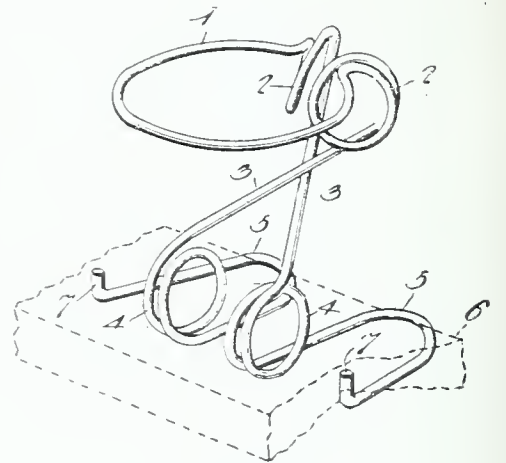
Monday has obtained a number of patents on churns, and was the originator of a certain type of churns now on the market. His latest idea is an advance step in this art which is worthy of the inventor. It consists of a rotary dasher, shown in perspective by a separate view, formed of a disk pro-

vided with a central chamber or recess 34, and having wings leading from the edge to said recess, said wings being located at diametrically opposite points and extending from the periphery of the disk toward the center. The dasher is secured to the lower end of a vertical shaft, which shaft is rotated by means of suitable gear mechanism mounted upon a frame that is attached to the cover of the churn body. When the dasher is rotated, the cream in the central chamber or recess will be thrown outward by centrifugal force, and as the dasher is located beneath the surface of the cream, this will tend to create a vacuum, and air will be drawn downward through the tubular dasher rod and thrown outward by the rotation of the dasher. Stationary agitators 4 secured to the sides of the tub catch the cream in its outward movement and the agitation of the cream is rendered complete. The recesses 36 in the dasher impart a downward movement to the cream.

Bed Spring.

One of the most ingenious springs for beds, upholstering, or other analogous purposes has been patented by a well known inventor of Knoxville, Tenn., Mr. Sam Harbison. The structure is such that it is extremely resilient, and yet will not become crushed down by continued service. It is formed from a single piece of wire, as

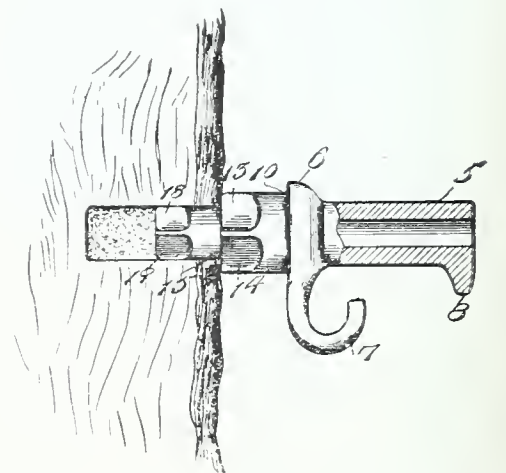
shown in the accompanying illustration and comprises an upper horizontal head loop 1 connected to coils 2, which coils constitute the upper ends of crossed standards 3. The lower ends of these standards are also provided with spring coils 4 from which project



substantially U-shaped fastening stirrups 5, the terminals of which are upturned as shown at 7. The stirrups are arranged to embrace a slat 6 which forms the supporting means. The inventor sometimes employs modified forms of stirrups in which the upturned terminals are dispensed with, and the stirrups are fastened together at their looped portions. These springs may be grouped in any manner desired and when covered, constitute a smooth yielding cushion which, while fully resilient, will not become distorted or broken.

Sap Spout.

The makers of maple sugar will undoubtedly be interested in a meritorious improvement in sap spouts invented and patented by Mr. David Rudd, of Lacona, N. Y. As is well known, the flow of sap is periodical, and it often happens that during a

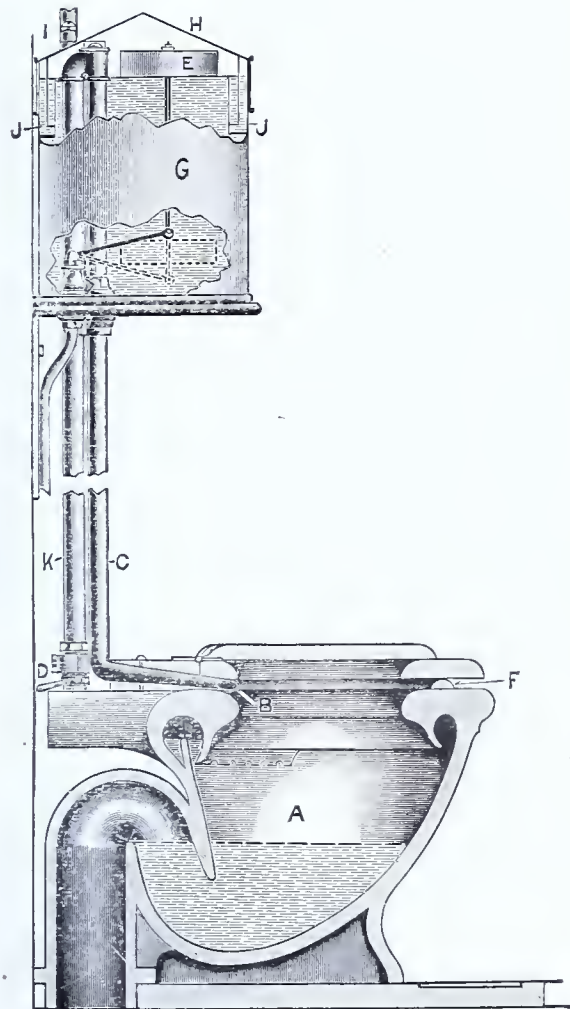


period of inaction the walls of the opening, in which the spout is placed, becomes incrustated, preventing the free flow of sap. Mr. Rudd has overcome the difficulty in a simple, though ingenious manner. The spout 5 is formed in the usual manner with the flange 6, the hook 7 and the drip lug 8. The inner end has a contracted shank portion 15 and an enlarged portion 10. Both portions have angular inner ends that constitute cutting edges. The inner end is inserted in the spout receiving opening in the tree as shown, and should the flow become stopped, the opening may be reamed out by means of the larger section thereby exposing a new surface through which the sap will freely flow.

VENTILATED CLOSET BOWL.

TO insure a thoroughly sanitary closet and toilet room, all water closets should be fitted with the new ventilator recently devised and patented by a well-known resident of Binghamton, N. Y., Mr. W. H. Stilwell.

The object of the invention is to provide means for withdrawing the vitiated air from the bowl at the same time that the latter is flushed, and forcing such air to a point outside of the house or building. The means employed is of such a novel character and is so simple



and efficient that it is well worthy of careful attention. The structure can be manufactured at a cost very little, if at all, in excess of the devices now in general use, but the advantages accruing therefrom, will more than repay double its cost, and it can be only a question of time before its general installation will take place in the homes and buildings of those persons who understand the necessity of perfect sanitation.

The construction will be readily apparent by referring to the accompanying cut, which represents a vertical sectional view through a closet with the improved apparatus applied thereto. The flush tank which is shown at G has an air-tight cover closed by a water seal, as illustrated. From this tank leads the flush pipe B that is connected to the bowl in the usual manner, and has contiguous to its lower end a controlling valve C, which is convenient to the occupant of the seat and does away with the unsightly and troublesome chain pull, at the same time making the flushing operation noiseless. The water supply pipe communicates with the lower portion of the tank, and is controlled by a peculiarly arranged float F that is slidably mounted on the valve rod H whereby it may fall to the bottom with

the water before the supply valve is opened.

The important feature, however, resides in the ventilating apparatus. A vent pipe A leads from the upper portion of the bowl to the upper portion of the tank and its upper end is sealed in the manner shown. A valved air-discharge pipe leads from the upper portion of the tank to a point outside the building. The bowl is constructed so that it will be practically air-tight, and the operation is as follows: when the bowl is flushed, the water will, of course, be discharged from the tank, thereby creating a partial vacuum therein, as the cover is sealed air-tight.

To overcome this vacuum, the vitiated air within the bowl will rush from the same through the vent pipe and into the tank, where it will be held against returning by the sealed upper end of the pipe. As soon as the water in the tank has reached its lowest level, the supply valve will be opened and fresh supply of water introduced, which will displace the air drawn from the bowl and expel it through the discharge pipe to the exterior of the building.

The simplicity of the arrangement will be apparent. It must necessarily be positive and un-failing in operation, as there is nothing to become deranged or get out of order, while access to the tank may be readily gained by simply removing the cover. Anyone who may be interested in the invention, which is thoroughly protected by patent, and desiring information in regard thereto, should address Mr. W. H. Stilwell 258 Court Street, Binghamton, N. Y.

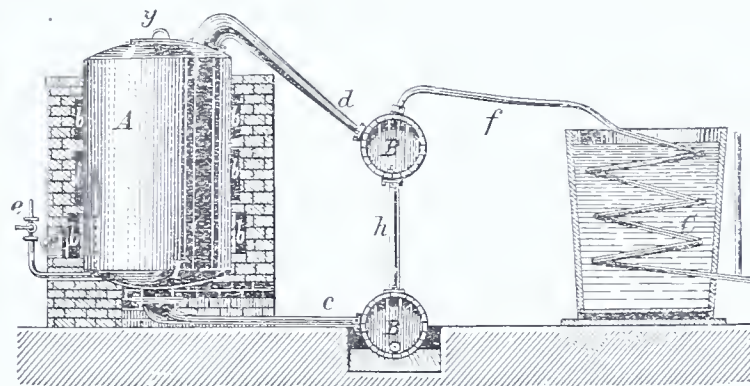
Are Potatoes Abnormal Growths?

A French botanist asserts that the potato is not a natural organ of the plant on which it grows, but is an abnormal growth or excrescence due to the action of a fungus. According to his theory, the tuber belongs in the same class with the puff-ball, the may-apple, and the oak-gall. He supports his assertion by the fact that the tubers will not form unless a certain fungus is also present in the soil. It is well known that potatoes gathered for planting have a resting period of several months, after which vegetation is resumed. Even in well aired and well lighted cellars, the "eyes" develop and send out stalks. Cultivators are careful to allow this first development to take place normally, for cultivation succeeds well only when these eyes are sprouted. For a period of thirty or forty days after planting, the stalks grow and put out leaves and flower buds, while other buds in the lower part of the stalks push out underground stems. In May, the terminal buds of these stems cease to throw out sprouts. They become hypertrophied and form tubers in which the larger part of the nourishment sent out is stored up. The aerial buds are now almost completely arrested in their growth.

APPARATUS FOR WOOD DISTILLATION.

SINCE the commencement of wood distillation as a practical industry nearly fifty years ago, many changes and improvements have been made in the machinery employed, which for economical practice, requires to be adapted to the kinds of wood to be worked, the quantity to be treated at each operation, and to which of the distillates, tar and acid, is regarded of first importance. Wood is a bad conductor of heat, so that in the construction of all retorts, the problem is to secure as prompt and thorough a distribution of heat as possible throughout the mass, combined with such dimensions as will render the charging of the retort with wood and the withdrawal of the charcoal reasonably convenient. All plants for wood distillation combine substantially the features which are shown in the following illustration, which is a simple, upright retort, with a capacity of about 2½ cords of wood.

In this figure, the retort A is made of ordinary or galvanized boiler plate.



set in brick masonry, with a spiral flue b, so that the fire introduced at the furnace a is drawn by the chimney draft round and round the outer shell of the retort, which is filled with wood and the charcoal discharged through the manhole y. To quicken the heating of the charge to 100° C.—at which temperature the development of gases begins—superheated steam is turned in through the pipe e. The crude inflammable gases which are first generated are discharged downward into the fire through a pipe not shown in the illustration. As the heat increases, the steam and gas pipes are closed and the distillates begin to pass over. The tar flows downward through the pipe c, the acid gases pass upward through the beak d into the drum B, where the tarry vapors condense and are carried downward to the tar tank (lower B), which is kept cool by partial immersion in water. The pyroligneous acid gas, nearly freed from tarry impurities, passes on through f and the cold coil C, where it is condensed and pours out in the form of raw wood vinegar. These are the rudiments of the process.

The products of wood distillation form four primary groups, which with their principal derivatives, may be synopsized as follows:

(1) Uncondensed gases, which may be burned as fuel or, after certain treatment, used for illuminating purposes.

(2) Tar, from which are derived benzol, naphthalene, paraffin, rosin, and phenyl acid (creosote).

(3) Pyroligneous acid (wood vinegar), from which are derived acetic acid, acetone, and methyl, or wood-alcohol.

(4) Charcoal.

In practice, it has been found most economical to set up the distillation plant as near as possible to where the wood is cut; in other words, at the point where all conditions of transportation for raw material and products are most favorable. The ordinary practice involves the distillation of hard woods—beech or oak—and the recovery of charcoal, tar, raw wood vinegar, and methyl alcohol. The charcoal, or first product, is ready for market on being withdrawn from the retort. The tar is sent as raw material to chemical factories, where it is worked up as a separate industry. The methyl alcohol is also a commercial product and is usually sold in its crude state; but the wood vinegar is usually consumed on the spot for the production of acetate of lime, which is a convenient vehicle for recovering and transporting the pure acetic acid contained in the wood vinegar, which for this purpose is treated with ordinary limestone. Assuming, therefore,

that a firm or company should wish to establish a modern plant of this kind, the calculation would be somewhat as follows:

Distilling apparatus complete, without buildings, for treating 22½ cords of wood per day, would cost \$24,990. If the capacity were increased to 30 cords per day, the cost of plant would be about \$30,940. If greater capacity is desired, it would be advisable to duplicate the same apparatus, instead of further increasing the size of the unit.

If beech wood is used, the raw vinegar obtained will be from 40 to 45 per cent of the weight of wood, and the vinegar should yield from 9 to 12 per cent of pure acetic acid. Assuming that this is to be recovered on the spot, a plant for the daily production of 2,640 pounds of acetate of lime would cost, exclusive of buildings, about \$3,570. This assumes that the raw pyroligneous acid is to be treated with ordinary limestone, a process which involves no technical difficulties. So far as can be ascertained, the apparatus for the industry involves few or no essential features which are covered by patents, so that a modern scientific plant once established and its success demonstrated, could be duplicated to any extent which the supply of material and the market for its products might require.

THE INVENTOR'S WORLD OF MARVELS.

GEORGE ETHELBERT WALSH.

WHEN the complete history of invention has been written, it will inevitably prove a popular book because of the innumerable chapters of romantic nature that must of necessity adorn its pages. The modern word invention comes from the Latin *invenire*, which literally translated means to come or stumble upon by chance, and the early application of it to denote the accidental discoveries of useful contrivances was peculiarly apropos.

Invention was not an art or science in the days of the early discoverers of laws and principles that have since revolutionized the material world, and the so-called inventions were all accidental or fortuitous in their origin. The professional inventor of to-day applies himself to the study of certain mechanical laws and necessities for the avowed purpose of discovering or inventing something new that will simplify old methods of labor and production, and the products of his inventive mind have less of the accidental about them than was formerly the case. Invention has to a certain extent become a legitimate profession, and it is a science or art that requires the co-operation of a mind peculiarly endowed with rare qualities and the accumulated wisdom of the ages.

There are purely fortuitous discoveries and inventions to-day, and some of them are of the greatest importance in the material world; but the great bulk of the inventions come from the laboratories and machine shops, where trained inventive minds daily apply themselves to the task before them. Intelligent experiments along certain lines are constantly being pursued by the world's brightest minds, and the ends which they have in view are generally pretty clearly foreseen. Accidental discoveries will often be made while in pursuit of a particular idea or invention, and these may be set down as among the fortuitous inventions of the present age.

Prior to the present century of material progress and invention, the great discoveries were nearly all the products of chance observation. The story of the boy watching the steam forcing up the lid of a cooking vessel, which suggested to him the power of steam, and the account of Newton establishing the existence of gravitation through the falling of an apple, are familiar popular illustrations of how the great discoveries of the past were made in an accidental manner. Faraday, the great scientist and inventor, himself confessed that the fortuitous discovery made by rubbing a piece of amber released "an invisible agent which has done for mankind far more wonderful things than the genii of Aladdin did or could have done for him." The discoverer of gunpowder was as much startled by what he had done as the world which soon heard of it. A child actually first discovered the magnifying power of two lenses

placed at certain distances apart, and its father, being an optician, took the suggestion up and produced the first telescope out of a tube of pasteboard. The manufacture of leaden shot by dropping molten lead from a high altitude was discovered by chance, and Arkwright obtained his idea of spinning by rollers by chance observation.

The list of ancient discoveries and inventions produced fortuitously could be extended indefinitely, and even those of modern times produced accidentally would make a formidable list. But most of these latter were also directly attributable to the genius and hard work of the inventors. Thus Professor Roentgen would never have discovered his marvelous X-rays had he not been experimenting in a dark room with a Crooke's vacuum tube. Neither would Edison have invented the phonograph had he not experimented over and over again with the telephone, which one day accidentally set him thinking when the vibration of his voice had sent the fine steel point of the mouthpiece into his finger.

The modern inventor and discoverer of new laws of the material and mechanical world is a man who pursues his profession with the same steadfast purpose that a physician or lawyer devotes to his calling. The day of the purely fortuitous invention has mostly passed. Even the inventor of the small things which amuse or supply a long-felt want is usually one who has devoted years to the study and experiment of certain lines of work. The inventor of the simple puzzle called "pigs in clover," which had a remarkable run and netted a small fortune to its discoverer, spent nearly a lifetime in making popular games and puzzles before he hit upon the thing that made his reputation. He was a genius in this particular line, and he applied himself assiduously to the invention of new games and toys. Sam Lloyd, according to his own account, studied mechanics in all its branches, and, while gifted with certain ingenuity which enabled him to see patentable ideas, he pursued his studies as steadily and persistently as if he were working out a mathematical demonstration.

Modern inventing has become a profitable and lucrative profession for those who have the inventive faculty and the willingness to pursue it as others do a business or practice. The world owes much to the inventors of the age, but if our life and method of living have been revolutionized and improved by their ideas their rewards have been ample. The successful owners of popular patents receive remunerations that are almost princely. Some of the ideas seem ludicrously out of all proportion to the money reward given, but there is usually a law of compensation in all things.

The inventors of important machinery and labor-saving devices that have been only poorly rewarded in money have died with a reputation that will forever cling about their names, while the discoverers of some of the little useful articles that have made hundreds of thousands of dollars for them are unknown to the mass of readers. The inventor of the metal shoe-button fastener, which does away with the old slow method of sewing the buttons on by hand, made an enormous fortune from his patent, and the inventor of the wooden shoe-peg made half a million dollars. The invention of the suspender garter was sold outright for \$50,000, and the discoverer of the glass lemon squeezer received about the same sum for his idea. The ball and socket glove fastener is often quoted to show the large fortunes that

are sometimes found in small inventions. The inventor of this patent is said to have received in royalties nearly a million dollars, and the discoverer of the double ball clasp for pocket-books and bags has reaped nearly as large a fortune. The automatic inkstand has paid its inventor over \$200,000 in the short time since its introduction, and the invention of the modern automatic tin-can openers brought an independent fortune to its fortunate discoverer. The inventor of such a simple thing as the modern shipping tag, with its patent ring for preventing the string from tearing out, received hundreds of thousands of dollars. The little brass paper clip fastener, the improved safety pin, the rubber pencil tip, the hook and eye with a hump to prevent slipping, the automatic lock and brake, the bicycle whistle and bell, and scores of other inventions of a similar nature, have rewarded their discoverers amply in the coin of the realm.

Although many of these apparently simple inventions were discovered by chance, most of the inventors were either long associated with the work in hand, or had come to realize the necessity of some such invention to save time and labor. Necessity is the mother of invention, to-day as always. The idea that fortuitous inventions have formed a prominent part in the world's industrial and material development has induced some to attempt the invention of useful articles without any previous experience or preparation. They have trusted to blind chance, and have failed. Accidental discoveries cannot be taken in the literal sense, for very few indeed have ever been the product of an untrained and unobserving mind. A mechanic who has spent half a lifetime in one department of human endeavor may see the great need of a simple invention to save time or labor in his work. Year by year his mind dwells at intervals upon the subject, and one day an idea flashes upon his mind or a simple accident suggests the way of inventing what is needed. Such an accidental invention is really the result of years of study and observation, and it is thus that many of the simple inventions have come into existence.

The great inventors of the world, who hold a foremost position in popular estimate because of the widespread effect of their patented ideas in revolutionizing industries and modern life, have not always been as freely and amply rewarded in money as their benefactions to the race justified. Many of the early ones died comparatively poor, and others spent the sums they received in royalties in making new experiments. The pecuniary rewards had little effect upon them, for they were laboring in a field of thought and discovery for the love of the work, and the money considerations were only the incidentals of their life. The improvement of the patent laws, both in this country and in England, has made it possible for a great inventor to reap a fortune from his patents, while at the same time laboring in the interests of humanity. Consequently few, if any, of the modern inventors of note have failed to receive just returns for their discoveries. Had Morse, the inventor of the electric telegraph, been born a generation later, he would have made far more money from his great discovery. Honors simply poured upon him in time, but he never realized the independent fortune from his inventions that subsequent laborers in his field did.

As instances of the pecuniary rewards bestowed upon great inventors in modern times mention should be made of Edison, Tesla, Bell, Thomson, McCormick, Corliss, Colt, Howe, and others. Elias Howe, the inventor of the sewing machine, which has lightened the burdens of the world more than can be expressed in figures, realized fully \$2,000,000 from his patent. But it was only after years of hard struggle to get his patent on the market, and then

after a decade in fighting infringers in the courts, that he received the actual reward of his labors. Alexander Graham Bell, whose name is so closely associated with the Bell telephone and multiple telegraphy, made several millions from his numerous patents. Cyrus Hall McCormick, the inventor of the reaping machine, left an enormous estate at his death in 1884. It was estimated in 1859 that his invention saved the country at least \$55,000,000 per annum, and in view of this no one can begrudge him the ten odd millions of profits he made as the result of his reaper. George Henry Corliss, the inventor of the famous Corliss engine, which revolutionized the construction of the engine and saved enough fuel to more than double the capacity of any machine, amassed an immense fortune, variously estimated at \$5,000,000 to \$6,000,000. Samuel Colt, of the Colt revolver fame, which it has been said paved the way for the easy conquest of Mexico by the American soldiers, realized an ample fortune from his invention, and died in 1862 a very rich man. Hayward A. Harvey, the inventor of the Harveyized steel armor plate process, brought fame and honor to his country by his invention, and even to-day the Harveyized steel armor plates stand without a peer. Mr. Harvey died in 1893, the possessor of a fortune that placed him in the millionaire class, and his patents are still accumulating money for his heirs.

There is a group of three living inventors to-day whose names are household words, and whose inventions are accumulating fortunes for them every year. Thomas Alva Edison is probably the best known, and there stands to his credit such important inventions as the phonograph, duplex and quadruplex telegraphy, the carbon transmitter telephone, the incandescent lamp, the electric railroad, the electrophone, the motograph, the megaphone, the phonoplex telegraph, the electric pen, the kinetograph, the magnetic ore separator, the fluoroscope, the new vacuum light, and numerous others. One does not wonder, with so many important discoveries to his credit, that Mr. Edison counts his fortune in the seven figures. He is probably the most important inventor of the century in the matter of revolutionizing industries by his inventions. A second member of this group, who is hardly less generally known, is the tall, thin Austrian, who has come to live in our midst to work out problems that scientists all over the world dared not touch. Nikola Tesla is not a past but a present and future star in the firmament of inventors, and from his laboratory come now and then the hint of wonders that his brain has conceived and his hand wrought out in material form. Tesla is a true inventor of the old school, laboring for the love of his work and careless of the pecuniary rewards, but these latter are flowing in upon him at a rate that must be extremely gratifying. It is said that if he would devote his inventive genius to the discovery and manufacturing of articles of general industrial use, he could amass several millions in a few years, but he prefers to labor in his own way, working out intricate problems of electricity that may never return him much pecuniary reward.

Elihu Thomson, the third member of this group of modern living inventors, was associated with Professor Edwin J. Houston for many years, and their combined inventions of electric dynamos were put into practical working use under the company's name of Thomson-Houston electric works. He was the inventor of electric welding and brazing, and his experiments with alternate current induction, and his application of the air blast to switches and commutators for blowing away destructive arcs, have won for him world-wide renown and a great fortune. Westinghouse, the inventor of the air-brake which bears his name, should be included in the list of latter day inventors who have reaped immense fortunes from the direct application of their genius.

REDUCTION OF
COPPER ORES.The Pierre
Manhes
System.

THE known processes of metallurgy do not permit the economical treatment of copper ore containing less than 3 or 3½ per cent of copper. To extract the copper from low-grade ores, recourse is had to the wet system, which consists in dissolving the copper in an acid or saline solution, in order to separate the sterile matter which accompanies it, and then to precipitate it to the metallic state by chemical reaction. The wet system is applied also to the treatment of various copper products—slag, earth, etc.—carrying precious metals, which could be isolated with difficulty by fusion. These processes have taken great extension during recent years. They have permitted the treatment of ores which had previously been neglected because of their poverty, and they produce actually about 40 per cent of the copper extracted in the entire world. As the copper forms only a small proportion of the ore, it is necessary that the processes should be applied inexpensively to immense quantities of the raw material. It is impossible, therefore, to consider the transportation of the mineral to a distance: it must be treated at the place of origin with cheap reactives.

The copper is generally contained in the ores in a state of sulphur—more rarely in the state of carbonates, arseniates, or silicates. The oxidized combinations are soluble in diluted acids, such as sulphuric acid or muriatic acid. The sulphurs, on the contrary, are very slightly soluble, and must be transformed either into sulphates or chlorides before being submitted to the action of the dissolvents. The sulphatization takes place cold and is effected slowly under the action of the air. More generally, the transformation of the sulphurs into sulphates is determined by an oxidizing roasting, effected either in mass or in a furnace. The transformation of the sulphurs into chlorides is also produced by roasting: but instead of permitting the oxygen alone to act upon the ores, they are mixed with chlorid of sodium, which determines the chloruration.

The sulphates or chlorated ores are submitted to a methodical washing, which removes all the salts of copper which they contain. The dissolution thus obtained is then treated by old rails, in the process of which the iron substitutes itself for the copper in the salts, and produces a precipitate of metallic copper called cement; this is subsequently refined in reverberatory furnaces.

The ores of Rio Tinto, formed of pyrites of iron containing 2½ per cent of copper, are roasted in piles in the open air. The roasted ore is then placed in large scouring basins constructed of masonry. These basins are 98 feet by 33 feet and 59 inches deep, and are supplied with a false bottom of slightly inclined planks, so perforated as to permit the liquid which filters through the mass to disappear under the false bottom, and from there through drainage sluices into the basins of cementation. The scouring is effected by water, which is renewed many times, until it contains no trace of copper. The residue of the scouring is mixed with small ore

and piled in heaps 9.9 to 13 feet high, through which apertures are made for the circulation of air. Under the influence of atmospheric agents, the mass becomes warm, the sulphurates and oxides during the first roasting become transformed into sulphates, and at the end of six or eight weeks, the mass is subjected to a second scouring. The residue is again exposed to the air and scoured, and so on during a period of two years. At the end of this time, the ores are exhausted, and contain but the slightest traces of copper. At Rio Tinto and Tharsis, 500,000 tons of ore are constantly in treatment.

THE PIERRE MANHES SYSTEM.

The methods of manufacturing black copper commonly employed require so many operations, and such heavy expense for labor and fuel that of late years the industry has not been carried on, except in countries where coal or wood is cheap. Many attempts have been made to remedy this condition: furnaces have been enlarged, the products of the roasting have been utilized, but the consumption of fuel has been diminished only a little and continues to be from 15 to 18 tons per ton of copper produced. The only notable progress realized in the manufacture of copper has been due to the application of the Bessemer retort in the treatment of copper slag.

The Bessemer process consists in blowing air under strong pressure across the molten metal. In traversing the liquid mass, the oxygen of the air burns the divers impurities and refines the metal. A metallurgist of

elements requiring to be oxidized do not exceed 9 to 10 per cent of the weight of the metal. The copper matte, on the other hand, contains in general only 20 per cent of copper; it is therefore necessary to remove by oxidation 80 per cent of the matter treated. The foreign elements in the cast of iron, silicon, and carbon develop a considerable quantity of heat in burning—the first 7,800 calories, the second 8,000 calories—which considerably raises the temperature of the metallic bath and prevents all danger of chilling from the action of the air. The sulphur of iron, on the contrary, produces only 2,200 calories and 1,500 calories; because of this, the first efforts made in England by Mr. Holway to treat copper mattes in the Bessemer converter ended in complete failure; the mattes became solidified before being refined. Mr. Manhes was not discouraged by the non-success of the English metallurgist, and made numerous tests in a copper mill at Vedenes, Vaucluse, and then in the mill at Eguilles, near Avignon. He supplied himself with a small retort with a capacity of 110 pounds, after the fashion of the ordinary Bessemer apparatus, with an air chamber at the base and vertical blast pipes ejecting air from the bowl in the metallic bath.

The matte containing 25 to 30 per cent of copper was melted in a little furnace, and the liquid was paid into the retort. The air blown across the matte rapidly oxidized the sulphur and the iron: the sulphur escaped in the shape of sulphurous acid, the iron formed with the potter's clay facing the retort producing a fluid dross. In the beginning, the operation proceeded well; the combustion of the sulphur and iron sufficed to maintain the fluidity of

of the converter, and it was no longer exposed to the oxidizing action of the air. It thus escaped from treatment, and the copper it enclosed could be obtained; under these circumstances, it was necessary to melt the matte enriched to 60 per cent to separate from the dross, and finish the operation in a retort newly lined: the resulting copper contained from 1½ to 2 per cent of foreign matter.

Mr. Manhes has succeeded in suppressing these inconveniences, by using a cylindrical converter on horizontal axes, which is turned by means of a crank with cogged gearing. The converter is supplied with a longitudinal air chamber. By means of this apparatus, it is possible to treat poor mattes in a single operation. It suffices to incline the apparatus more or less to bring the air to a predetermined point. The blast is placed at the level required for the matter to be treated.

The retort, already red-hot, receives a charge of 2,200 pounds of liquid matte, across which the air is blown under a pressure of 25 to 30 centimeters of mercury, by placing the openings of the air chamber a little above the level of the matte: the temperature increases rapidly, and heavy yellow vapors arise from the molten mass. These are received in a sheath, which communicates with a large chimney 150 feet tall. As the operation advances, the cylinder is turned in such a manner that the air falls constantly on the matte and not on the dross, which floats above. After fifteen or twenty minutes of blowing, the fumes diminish and become green, then disappear altogether. The dross is then rapidly drawn upon the floor of the manufactory, after which the copper is drawn into the molds. The dross contains ordinarily from 2 to 3 per cent of copper in the form of nuggets. It is not therefore a real waste product, as it is mixed with fresh ore and returned to the furnace.

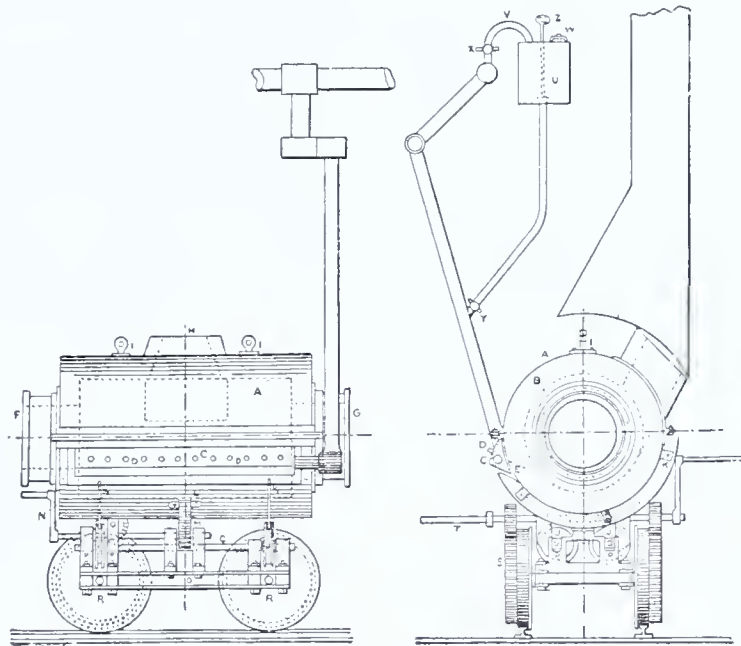
The raw copper obtained from the converter has the following constant composition:

Copper.....	98.5 to 98.8
Sulphur.....	0.9 to 0.8
Iron.....	0.6 to 0.4

It is possible to effect about twenty operations in the same retort, after which the lining must be renewed. The Manhes process permits the treatment not only of pure matte, but also of mattes containing arsenic, antimony, and lead: all these elements being reduced to volatile form at the same time as the iron and the sulphur; it is even possible to place in the converter, either alone or mixed with mattes, old bronzes and old brasses. Zinc, tin, and lead become oxidized easily: nickel and bismuth resist the action of the air and become concentrated in the copper. Until now, the Manhes process has been insufficient for the treatment of the two bodies named, while the elimination of arsenic and antimony, which created so many difficulties in the reverberating fusions, is easily controlled: these two metalloids disappear almost entirely and are probably thrown off mechanically by the air.

The total consumption of coal is about 5 tons per ton of merchantable copper: while for ore of the same value treated by the English method, it would be about 15 tons. The expense of manufacture does not exceed, at the Eguilles mills, \$28.95 per ton of copper, in spite of the miscellaneous costs and the high price of coke, while the expense of the treatment of copper by the reverberating process at Swansea amounts to \$67.55.

In short, the Manhes process simplifies the metallurgy of copper and makes it more economical. Instead of six or eight costly operations, the treatment is limited to a single casting to produce the matte, after which comes directly the work of the converter, from which is obtained a purer metal than the ordinary black copper. The process is used in several localities in the United States, Chile, and in Spain, and gives the best results.



Lyons, Pierre Manhes, has succeeded after many failures in employing the same method in purifying the matte.

His invention has been very successful in French metallurgy, and in the manufacture of copper will play a role as important as the Bessemer process in that of steel.

The analogies between these two industries are very great. In the same manner as in the blast furnaces, the ore is reduced to molten form, a combination of iron and carbon, so the copper ore is transformed by a simple fusion, the cast consisting of sulphurate formed of copper, of iron, and of sulphur. In both operations, the metals are separated from their envelopes and the principal products obtained are similar: in one case it is the carbure and "siliciure" of iron and manganese and in the other a sulphurate of iron and of copper. By the simple action of the air, the silicon, the manganese, and the carbon are eliminated during the Bessemer process: in the same way the sulphur and iron are eliminated from the copper matte, both being more oxidizable than the copper. But the difficulties encountered in the treatment of the mattes are very much greater than those of the treatment of steel, where the

the metallic bath and of the ferruginous dross, but, little by little, the matte became less liquid, and the draft of air produced a tumultuous evolution and projection of the dross outside of the apparatus. The copper settled in the bottom of the retort and congealed in the blow pipes, greatly obstructing them. The operation was stopped before the matte was completely freed from its iron and its sulphur.

Mr. Manhes then substituted in the place of the vertical blow pipes, other pipes injecting the air into the bath at a certain distance above the bottom of the retort. The air chamber at the base was replaced by a hollow circular crown, enveloping the retort at some distance from the bottom, and provided with lateral orifices injecting the air horizontally into the metallic bath.

In the apparatus thus modified, the copper no longer congealed, and as it was produced, dropped below the point where the air entered and there remained in a liquid state. The dross continued to be an embarrassment: it was necessary to melt it partially before the end of the operation, and even, when the matte was poor, to perform the operation twice, because the matte as it became richer in pure copper, became heavier and reached the bottom

MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Sigger, Patent Lawyer, Washington, D. C.

Willard O. Anderson, Henderson, Ky. Receptacle or Crate.—The patent recently issued to Mr. Anderson discloses a receptacle which is light, durable, freely ventilated and to some degree elastic, so as to render it capable of being roughly and rapidly handled without being damaged. It is well adapted for shipping, storage or transportation purposes, and is built up or constructed of a number of independent sections which are united in a peculiar manner to produce a receptacle having a smooth, unobstructed interior, and rigid frame bars all disposed upon the exterior of the crate, and having such relative disposition as will permit any side thereof to lie flat upon a supporting surface. The crate is inexpensive, and is destined to take front rank as a shipping package.

Edwin G. Nicewaner, Pittsburg, Pa., & George C. Keim, Johnstown, Pa., assignee. Book Displayer.—This display device is intended primarily to effect a maximum display within a minimum space, in order to economize wall and floor space in a store, or the counter space of newstands, and is arranged to facilitate the inspection of a large number of books or other objects by several people, each of whom may inspect the entire stock without disturbing the other individuals similarly engaged. The device comprises a suitable support, as for instance standards, or pendants, and a rotary display body composed of independently rotary sections, each of which is of hollow, polygonal form to provide a large number of display faces for the support of books, etc. The objects displayed are retained by clips, and each section is equipped with internal restraining means which permit the individual faces of the rotary sections to be successively brought into position for the inspection of the display, and hold the sections rigid during such inspection.

John C. Snyder, Bowling Green, Ohio. Valved Piston.—The invention described in this patent is an ingenious valved piston or working valve for artesian or other wells. Wells of this character are bored or sunk to great depths, and are lined by a metallic well casing or tube containing a loose foot-valve. Above this foot-valve the working valve or piston is arranged to operate, and is usually provided with packing rings or suckers, which are liable to accidental displacement and derangement. Mr. Snyder's piston is so constructed as to make it impossible for these packing rings or suckers to become broken or detached, and at the same time facilitates the removal or replacement of worn parts. The piston is provided with a series of suckers alternating with a series of metal sleeves on the piston. At the upper end of the piston is located a valve enclosed by a removable cage, and at the lower end of the piston is screwed a sleeve provided with a plurality of notches of different lengths, for the reception of a spring cotter engaging one of the notches to prevent accidental unscrewing of the sleeve.

William W. Loban, Williams, Iowa. Dumping Wagon.—An exceedingly novel and practicable wagon body, having its bottom divided into two longitudinal sections, which are hinged at their inner edges so as to swing downwardly to dump the contents. At

each side of the body and disposed longitudinally thereof is an intermediate-fulcrumed vertically-swinging lever, one end of which is connected by a pivot link with the free edge of the adjacent bottom section, while the opposite end of the lever is provided with a handle and is adapted to snap under a keeper carried by the free edge of the bottom section, whereby the latter may be locked in its closed position. The bottom sections are tilted downwardly by disengaging the levers from the keepers, and then swinging their handles upwardly so as to force the outer edges of the bottom sections downwardly.

Charley McDonner, Wausaukee, Wis., and Mark Hagle same place, assignee. House-Moving Track and Caster.—This well-known inventor, whose portrait was printed in the November 1901 Age, has recently been granted two patents, one for a house-moving track, and the other for a caster particularly adapted to travel upon the track. The track consists of wooden sections, each of which is provided at its top with a central longitudinal depression. A metallic strip is secured to the back of the depression with one end terminated short of the adjacent end of the track section, and its opposite end projected beyond the same. The side walls of the depression are inclined or beveled upwardly and outwardly, and metallic side strips are secured to the top of the track section at opposite sides of the depression therein and having their inner edges beveled upwardly and outwardly. At that end of the track section where the central metal strip is terminated short of the end of the section, there is a projected metal cuff to embrace the contiguous end of another section, the projected central metal strip overlapping the first-mentioned section and abutting against the corresponding metal strip.

The caster is formed in two detachably connected shell sections, one of which is provided at its upper end with a laterally-projected attaching plate with which the upper edge of the other shell section has a tongue and groove detachable connection, both shell sections having corresponding perforate ears for the reception of detachable fastenings. The lower end portions of the shell sections have co-operating sockets to rotatably receive a large caster ball which projects below the shells. Above the caster ball is a circular socket for the reception of a plurality of anti-friction balls.

Heber K. Hansen, Logan, Utah. Stone Cutters Tool.—This device is formed in longitudinal half sections having registering central grooves for the reception of a handle, and provided at opposite ends with registering sockets for the reception of bits, the inner ends of the sockets being laterally enlarged to present transverse biting edges. Butt-plates are seated in the backs of the sockets so as to overlap the joint between the sections, and fastening bolts pierce the sections between the handle grooves and the bit sockets so as to draw the sections together and force the biting edges into snug engagement with the bits.

William Kitts, Bradrick, Ohio. Stop Attachment for Steam Governors.—This device is adapted to be connected with the valve stem so as to close the valve should the governor fail to work for any cause, as for instance, the slipping or breaking of the governor-belt, and comprises a pair of reversely-swinging spring-actuated arms, one of which is connected to the lower section of the valve stem, which is entirely separate from the upper stem section. The inner end of this arm lies upon the other arm and is provided with a finger which engages a pivotal trigger carried by said other arm, so as to normally interlock the two arms, the rear end of the trigger being arranged to engage with a stop should the valve stem rise above a predetermined limit, and

thereby disengage the trigger from the throw arm, which will be violently thrown downwardly by its spring so as to close the valve.

John H. Marshall, Belton, Texas. Wheel Scraper.—This scraper is particularly adapted for the traction wheels of harvesting machines, and comprises a flat metallic bar having an intermediate laterally offset portion which is tilted or inclined, and has its front edge beveled to form a scraping edge. The opposite ends of the bar are provided with terminal shoulders lying at that side of the bar which is opposite the offset scraper portion thereof, and terminally hooked bolts pierce the bar so as to cooperate with the respective shoulders and form clamps for fastening the device to the frame of a machine.

Edward Hafermehl, Lawton, Oklahoma. Pneumatic Attachment for Mowing Machines.—This invention employs a pneumatic blast to force the grain into engagement with the cutting apparatus in lieu of the usual reel, and embodies a pipe located in front of the cutting apparatus and provided with a plurality of discharge nozzles. The inner end of this tube is supported upon a vertically-swinging arm carried by a part of the frame of the machine and controlled by a ratchet lever to raise and lower the same so as to adjust the plane of the blast of air. A suitable pneumatic blast device or blower is mounted upon the frame of the machine and driven from some working part thereof, and is connected to the blast pipe by means of a flexible tube so as to permit of the raising and lowering of the blast pipe.

Albert C. Meader, St. Joseph, Mo. Weather Board Marker.—This device embodies a longitudinally grooved bar having a slotted and graduated plate applied to the grooved face of the bar, and provided with terminal shoulders to span a weather board. The marker proper consists of a rotatable disk having a beveled cutting edge working flat against the plate. A handle centrally pierces the disk so that the latter rotates thereon, and the inner end of the handle is screw-threaded and is fitted eccentrically into two disks, one of which works in the groove of the body and the other works in the slot of the plate, so that in marking warped or uneven boards, the handle may be turned to project the cutting edge of the marker at a greater or less degree beyond the edge of the body.

Max Snyder, Beatty, Pa. Boiler Tube Cleaner.—This is a device of considerable merit embodying a tubular casing having a steam inlet at one end and an outlet at the opposite end, the discharge end being provided with an interior valve seat, through which works a tubular valve stem, the outer end of which is open. The stem is provided with an exterior collar forming an abutment against which the steam acts to hold the collar against the valve stem, and thereby close the ports in the tubular stem. The outer end of the stem is provided with an adjustable head having rearwardly flared arms, the forward ends of which are adapted to enter or bear against the end of a boiler tube, so that by pressing forwardly upon the casing the latter will move on the stem and open the ports to permit of the steam rushing into the tube, and as soon as pressure is removed from the casing, the steam moves the stem to again close the ports.

Leontina Gully, New Fountain, Texas. Sham Bolster Frame.—This device comprises opposite tubular telescopic members to contract and extend the device. Each member consists of a plurality of substantially U-shaped rods which are embraced at their central portions by a circular band formed of inner and outer members, a similar band also connecting the free ends of

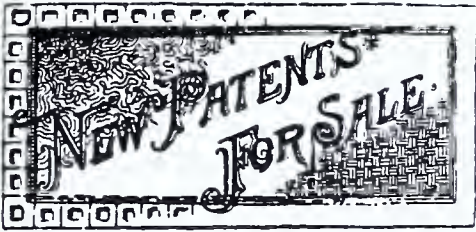
the rods, and the bowed end portions of the rods of each member being slidably received in crimps formed in the inner band section of the intermediate band of the other section, whereby the members are telescopically connected and are held against end-wise separation.

Frank W. Dent, Waukesha, Wis., and George W. Swaggart, and Byron Griffin, assignee. Wrench.—This is an extremely simple, quick-action wrench. The usual shank is employed having at one end a rigid jaw, the other end being formed into a suitable handle. Upon the shank is slidably mounted a movable jaw provided with a stem that carries a clutch loop surrounding the shank and normally held in binding engagement therewith by means of a spring secured to the stem. The loop carries a holding tooth that clutches the shank, this tooth being in the form of an adjusting screw, the inner end of which is provided with a circular biting edge that securely holds the sliding jaw against movement when bearing against the shank. By swinging the loop to disengage the tooth from the shank, the jaw may be easily slid in either direction.

Morgan Jolliffe, New Salem, Pa., & Thomas B. Brownsame place assignee. Curtain Fixture.—By means of this invention, a window shade roller may be supported in any desired position with respect to the window, and the curtain pole may likewise be held and adjusted with relation to the window and the shade roller, the pole support being detachable from the shade support so that the latter may be used separately. In the construction, a base plate is employed which is attached to the window casing and has an outstanding ear provided with a series of holes arranged to receive the journal pin of the shade roller. This base plate also has a pair of sockets arranged at right angles and adapted to receive a pair of similarly arranged fingers secured to the rear end of a shank, that is made of slidably associated sections. The outer section carries a pole-receiving stirrup which can therefore be adjusted toward or from the base. The entire device may be made of sheet metal and therefore constructed at small cost.

William R. Snyder, Tedrow, Ohio. Gate.—This gate is arranged to be opened from either side without the necessity of the operator alighting from a vehicle. The gate is of the sliding variety, having inclined tracks that rests upon rollers. Ropes are arranged across the gate, their ends being supported upon suitable standards and having operating knobs. These ropes pass through pulleys secured to the gate, one having a connection with the latch so that when it is pulled the latch is opened to permit the rearward movement or opening of said gate. As the entire gate is supported upon and guided by rollers, it may be actuated very easily, and during half of its movement it will operate automatically by gravity, on account of the peculiarly inclined relation of the tracks.

Van Buren Martin, Hopkinsville, Ky., & Thomas L. Metcalfe same place assignee. Cover for Grain Shocks and the Like.—The aim of this inventor has been to provide a structure which may be manufactured at very small cost, and can be placed upon a shock of grain or the like to protect the same from the elements. The main body or roof is made of tarred paper having a conical cap covering its apex and an inner strengthening cap. The most important feature, however, is the metallic or other rim which embraces the lower edge of the roof piece and thus prevents the tearing of the same. To this edge are secured fastening devices which are secured to the grain sheaves, and thus fasten the cap in place and prevent its being blown off in wind storms or the like.



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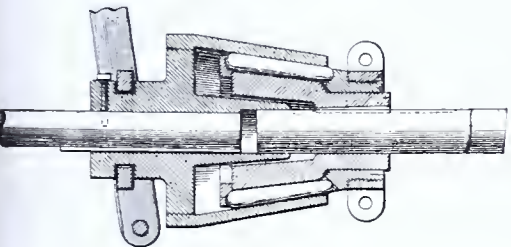
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FOR SALE.—Patent No. 692,754, for reversing clutch. Issued February 4, 1902. Specially adapted for use in boats propelled by gas engines. Simple, strong and compact. Address Charles R. Alsop, Middletown, Connecticut. (my)



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FOR SALE.—Canadian patent embodying same construction shown in U S patent No. 607,576, dated July 19, 1898. A journal bearing provided with means for securing a Babbitt metal or similar lining to the same. Invention has been tested, and is now in use on entire A. T. & S. F. Railway System. Address J. A. Swan, 1194 Clay Street, Topeka, Kan. (je)

FOR SALE.—U. S. Patent No. 665,429, dated January 8, 1901. Pool game register. For registering number of games played. Will sell entire right or lease on royalty. Address William Graham, Danbury, Iowa. (je)

FOR SALE.—Patent No. 680,106, dated August 6, 1901. Skirt Supporter. Can be made very cheap and will sell on sight. Patented in Canada and England also. Address C. H. Munson, 1710 Farnum St., Omaha, Neb. (my)

FOR SALE.—Patent No. 613,441. Safety Bottle Crate. Patented November 1, 1898. Something new. Very valuable. Write for particulars. Address George Chappell, 615 Riverside Avenue, Jacksonville Florida. (my)

FOR SALE.—Design Patent No. 35,420, dated December 10, 1901. Design for ferrule. Address J. K. W. Carson, Winchester, Kansas. (je)

FOR SALE.—U. S. Patent No. 686,591; also Canadian protection. Cable Oiler. Simple and inexpensive to make. Will oil or tar all kinds of wire cables. To those familiar with this class of work the merits of this patent will be immediately apparent, this being the only invention for oiling overhead cables. The oiler travels over the cable and every part of it is dipped. With this cheap device for oiling or tarring, cables can be made to give fifty per cent more wear. This patent is for sale, and can be made to bring large returns to the investor. For further particulars, terms, etc., address C. Larsen, Crockett, California. (my)

FOR SALE.—Patent No. 686,711. Belt or strap splicer for splicing leather. It is better than lining, rivets or hooks. Put on with hammer. Will sell outright or to manufacturer on royalty. Address R. E. Cain, R. F. D. No. 4, Platte City, Missouri. (my)

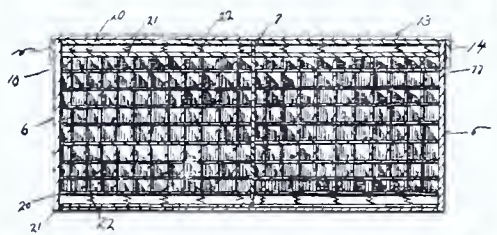
FOR SALE.—Patent No. 689,800, dated December 24, 1901. Pneumatic attachment for binders and headers. Provides a pneumatic blast to throw the grain against the cutting knives and onto the platform conveyor. Address Edward Hafermehl, Lawton, Oklahoma. (my)

FOR SALE.—Patent No. 548,992, wagon brake. self acting. Also patent No. 573,663, self acting car brake. Will sell either separately or together. Good chance for promoter. Address I. 'at Brown, Birch River, Nicholas County, West Virginia. (my)

FOR SALE.—Patent No. 687,240. Dated November 26, 1901. Dinner pot. Every household needs it. Address C. F. Kaul, Madison, Nebraska. (my)

FOR SALE.—U. S. Patent No. 649,646, dated May 15, 1900. Also Canadian patent 73,402, dated October 15, 1901. A double band umbilical truss. Bands are tightened simultaneously in opposite directions. Should find much favor among manufacturers and specialists. Will sell entire right or state rights. For information address D. S. Plum, Pleasant Valley, California. (jy)

FOR SALE.—Patent No. 651,887. Spring Egg Case. Will sell outright or lease on royalty. The eggs are placed on springs and protected from breaking. Address Jesse P. Riley, Point, Louisiana. (my)



WANTED.

WANTED.—I have a patent pending for an improved blackboard eraser. Would like to have same manufactured on royalty or contract. Address L. B. Williams, Greenville, Texas. (my)

WANTED.—Capital to manufacture and sell a patent novelty. Costs about one cent. Will readily sell for twenty-five cents. Will sell patent outright or lease on royalty. Address Samuel Bristow, Wetmore, Kansas. (jy)

WANTED.—Financial assistance to patent some practical plans for railway appliances and other devices. Will assign half interest in the same. Address Ira C. Doyal, Chumley, Alabama. (jy)

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WASHINGTON, MAY, 1902.

OUR ANNIVERSARY.

May the first marks the third anniversary of THE INVENTIVE AGE under its present management. We have escaped the usual nursery ailments and have been a robust youngster from the first. How rapidly we have grown in height, breadth and strength, modesty forbids us to say. You, our subscribers, have answered this question by greatly lengthening our subscription list, and in many other ways giving us evidence of your confidence and good will. We thank you.

While making no rash promises, we intend to merit a continuance of your favor; and as we grow in years and wisdom, we mean to give you a good, reliable, bright sheet and the best service within our power. The AGE appears this month in a new typographical dress. Other improvements will follow.

INCREASE OF THE PATENT OFFICE FORCE.

In the March issue of the AGE we called attention to the annual report of Commissioner Allen, and quoted his recommendation to Congress for a considerable addition to the force of the Patent Office, since which time the friends of the Patent Office have not been idle. Considerable pressure was brought to bear, and it gives us pleasure to announce that the recommendations of the Commissioner have been accepted, and a material increase in the force will follow. As usual, the appropriation will not take effect until the first of July. Full credit for this happy result is due to Commissioner Allen and the influence which he was able to exert on Congress.

As a result, at least two additional examining divisions will be established in the Patent Office, the remaining Assistant Examiners being distributed throughout the other divisions in which help is needed. With the addition of three Principal Examiners, four First Assistants, eight Second Assist-

ants, ten Third Assistants, and ten Fourth Assistants, it is believed that the necessity to work after hours will be avoided. This will be good news to every one, for it is well known that when the Patent Office actions are taken under such heavy pressure the work is slighted. Where an Examiner is confronted with the obligation to stay after hours if he falls behind with his work, the chances are in some instances that he will slight his examination of the cases before him in order to bring his division up to date.

The increase comes at a very fortunate time, because the number of applications this spring has exceeded the expectations of the officials. Owing to the annual leaves of absence allowed Examiners, and which are usually taken during the summer months, it is quite possible that the effect of the addition to the force will not be noticed until the fall, but it is believed by those having knowledge of the subject, that the present increase will be sufficient to keep the Patent Office in good running order for several years.

A series which should have been named "The Enchantments of our Modern Alladins," if considered solely from the point of view of romance, has begun in the May *Cosmopolitan*. But these sketches possess as well a business interest equally for clerk and capitalist, for manufacturer, farmer and merchant. The man who would understand the drift of our news in finance and business must read these lives, so full of incident, of chance, of hard labor and marvelous success. As it is, the series receives only the commonplace name of "Captains of industry." Each character is treated by a noted writer familiar with his subject.

COMPARISON BETWEEN THE UNITED STATES AND GERMAN PATENT OFFICES.

As is well known, the German Patent Office conducts a very rigid examination of applications for patents. In some respects its practice is more rigid than that of the United States Patent Office. In Europe it is accepted as a fact that when the German Patent Office issues a patent on an invention, it is worth patenting in other countries. Indeed the grant of a patent in Germany is considered the best possible proof of the validity of patents issued for the same invention by other countries. A comparison of the work of the United States Patent Office with that of the German Patent Office reflects credit on our administration of affairs. The German Patent Office has been in existence twenty-five years. In 1877 it began work with twenty-two officials. To-day, the number is one hundred and seventeen. The total number of persons employed increased from forty in 1877, to seven hundred and twenty-two in 1901. The revenues increased from \$100,000 1878 to \$1,200,000 in 1900.

The United States Patent Office instituted the present examination system in 1836. It was the first Patent Office to adopt the plan of making an examination of the prior art before issuing the patent. According to the report of the Commissioner of Patents, the revenue of the United States Patent Office for the year 1877 was \$732,342, and the ex-

penses \$613,152, leaving a surplus of \$119,190. For the year 1900 the revenue was \$1,350,828 and the expenses \$1,260,019, leaving a surplus of \$90,808. The examining force of the United States Patent Office is two hundred and twenty-seven, about double the examining force at the German Patent Office. The German Patent Office has issued 130,000 patents since 1877. The U. S. Patent Office has granted 512,613 patents during the same period.

PROPOSED AMENDMENTS OF THE ENGLISH PATENT LAW.

There has been considerable discussion in England in the last few years concerning changes in the laws governing the grant of patents. English practitioners have urged on those in authority to amend the laws to bring the English Patent Office in line with the practice of the United States and German Patent Offices. It is a well-known fact that out of a hundred patents granted in England, at least forty-two can be shown, from information in the Patent Office, to be invalid for want of novelty. It has long been felt as a scandal that the existing regulations provide no preliminary examination of applications for patents. Practically a patent can be obtained for almost anything by simply lodging a specification and paying the fees; and any number of applicants may secure protection for the same or for similar devices. The invention or process for which patent protection is taken may have been anticipated by previous applicants, or it may possess no originality whatever.

Some time ago the Board of Trade of London appointed a committee to look into the matter, and as a result of the recommendation of that committee, a bill was introduced in the English Parliament intended to confer upon the Patent Office larger powers of controlling the issue of patents. While it is conceded that the bill may not be all that could be desired, it is a move in the right direction, and one likely to give much satisfaction when in operation.

Of the three changes proposed, the one of greatest importance concerns the novelty of the invention. Under the bill, before a patent is granted, a search will be made by a skilled examiner to ascertain whether the invention claimed has been wholly or in part anticipated by any specification published during fifty years back. The reason for limiting the search to fifty years does not appear to us as logical. If the examination is satisfactory on this point, the patent will be granted; but if any anticipation is found, the applicant will be duly informed, and given an opportunity to withdraw or amend his specification. At this point arises a difficulty which has been settled in a peculiar way by the law makers. An applicant may refuse to alter or withdraw. In such a case the Comptroller has no power to reject the application, but he is at liberty to mark the specification with a reference to prior patents or documents bearing upon the subject. The absence of any such notification, however, is not to be understood as guar-

anteeing the validity of the patent. Some have thought that the Patent Office should have power to reject the application on the ground of want of novelty, as is done in the United States and German Patent Offices, but it has been urged that examiners are not infallible, and owing to ignorance of the true nature or scope of the invention, they may make a mistake. It is well-known that in countries like Germany and the United States, where the authorities have the power of refusal, there are numerous cases on record of valuable inventions having been improperly rejected. It is believed that the power given under the new law to the Comptroller to earmark a specification is quite broad enough. It will have the effect at least of acting as a deterrent on bogus inventions.

The effect of the examination in future will be to exclude many claims which now block the way of the genuine inventor and tend to embarrass manufacturers, and although the grant of a patent, after examination, will not amount to an actual guarantee of its validity, its market value will naturally be enhanced. It is believed that applications will diminish considerably under the new rule, and to offset this, an additional fee of one pound is to be added to the patent charges.

Another change of importance is with regard to the issuance of compulsory licenses. The existing enactment on this point has been found to work unsatisfactorily. The procedure is cumbersome and costly, and it is proposed to transfer the granting of compulsory licenses from the hands of the Board of Trade to the Courts. The new provision allows for the granting of licenses on suitable terms to applicants interested, if it can be shown that the requirements of the public are not adequately met. There are no restrictions imposed as to the working of the inventions within a given time.

We are indebted for much of this information to The Trade Journals Review, of London, which states that the proposed amendment to the English patent law has passed the first reading, and that a considerable period will be allowed to intervene between the first and second readings, in order to allow interested parties abundant opportunity of studying the provisions of the proposed new law before it is enacted.

THE PASSING OF IRON.

"It is worth nothing," says a writer in *Cassier's Magazine*, that the higher the grade of civilization, the more iron and steel are used per capita. It may be a matter of interest to know which has the supremacy, iron or steel. If we take the United States, we find that in time of depression Bessemer steel is sold at a less cost than iron, including bars, rods, sheets, plates, skelp, etc. That steel suits all the requirements of iron, except for rare cases, is evident, seeing that within the last five years, in spite of all the prejudices against using steel. * * * the two largest manufacturers of iron bars up to that time, commenced rolling nothing but steel, but to-day the quantity of steel bars sold by them is double the quantity of iron bars, iron skelp, iron sheets, and iron tin plates formerly turned out by them. Iron is a thing of the past, and every panic or depression in the iron and steel trade helps to push it farther into the background."

A Two-Hour Workday.

That brief periods of work at the highest possible tension, alternating with longer periods of rest or changed activity, represents the best working conditions, is asserted by Dr. Alexander F. Chamberlain, in the *Popular Science Monthly*. He finds evidence to support it in studying separately the life of the animal, the child, the genius, the criminal, the savage, and the athlete, and he believes that the experience of other than mere professional athletes, the methods of animal trainers, the results of half-time schools, the progressive reduction of the hours of labor for workmen and shop-employees, will furnish much more data of the same kind. Says Dr. Chamberlain:

"It has been argued that two hours physical labor *per diem* would suffice, were the product economically distributed, to keep the whole world well supplied, so great has been the advance in labor-saving machinery, methods of transportation, etc. Is it altogether unreasonable to suppose that two hours intellectual work, under right conditions and with economic distribution of the product, would suffice to keep the whole world supplied here also? Two hours of every one's best would be something worth achieving, physically and intellectually. An end something like this is the ideal to which things are bound to tend."

While it will undoubtedly be a long time before a two-hour workday will be the thing, there is no doubt that the indications all point to a gradual shortening of the hours for both physical and mental labor. That this will tend to prolong life is manifest. However, with the increase of the human race following the prolongation of human life, it would seem to be necessary for the hours of labor to be shortened, in order that every one may have an opportunity for employment. Otherwise conditions would become unbearable.

Early Predictions Regarding Photography.

A proposition was before the French Parliament in 1839, to vote a sum of money to Daguerre, the inventor of the daguerreotype process, as a national testimonial to his contribution to science. The matter was referred to the eminent scientist Arago for his report. This report was unearthed recently from the records by M. L. de Launay, who writes of it in *La Nature*. It is particularly interesting for its statement of the exact status of photography in its early infancy, and for its somewhat amusing forecasts. In the light of what we know to-day, the great Arago's opinions that photography would never become common, and that it could not be utilized to take portraits, have a curious interest. As to portraiture, which later became the most successful field of daguerreotype, Arago says in his report:

"The solution of the problem involves two apparently irreconcilable conditions. That the image may be formed rapidly, that is to say, during the three or four minutes of immobility that we may expect from the living subject, the face must be in full sunlight; but in full sunlight the most impassible countenance will be distorted into a grimace."

How many of our sober scientific predictions of to-day about wireless telegraphy, and wireless telephony, for instance, will read just as foolishly in A. D. 2000?

Blasting by Water.

A large rock in a quarry near Aberdeen, Scotland, was recently blasted by means of water. The block of stone had been provided with a number of drill holes, in order to blast it with dynamite. The superintendent of the quarry conceived the idea of utilizing the prevailing cold water as a blasting force, and saving the dynamite. The drill holes were filled with water, and after two nights the immense granite block was completely shattered. It is stated that the size of the block was 12 by 5 feet and weighed about 12 tons.

Danish Substitute For Varnish.

Hans Trojel of Copenhagen has taken out a patent for a substitute for varnish which is cheaper and can be used for the same purposes with equally good results. By his method, 100 parts of casein, from 10 to 25 parts of dissolved soap, and 20 to 50 parts of slaked lime, are added. This mass is thoroughly mixed and 25 to 40 parts of oil of turpentine are gradually united with it. The whole is thinned with water until it is of about the same consistency as real varnish. To prevent the settling down of the casein-chalk, ammoniac is added to the finished mass. Mixed with any color that may be desired, this substitute for varnish can be used for painting damp walls or wooden partitions, and dries very quickly. When quite dry, it can not be dissolved in water.

Water vs. Sand as a Fire Extinguisher.

Besides the usual fire apparatus, such as small chemical machines, fire buckets, etc., the keeping in a convenient place of a barrel of dry sand is a measure which cannot be too highly recommended. In wood working establishments, sand will always be found a more successful fire fighter than water: as the water poured over burning wood shavings or scraps, (particularly when these substances are saturated with turpentine, oil, or other like substances,) will be by far less effective than a few well directed handfuls of sand to stifle a conflagration at the start. Sand is also preferable, as it does not splash like water, it does not injure the floors nor trickle through to the rooms below; furthermore it does not cause floors to rot, if left standing on them. A full bucket of dry sand can be kept for years, for fire purposes, without undergoing any perceptible change, while water is usually found to have evaporated or otherwise disappeared when it is needed to put out a fire.

A New Alloy.

A German, named Walter Rubel, who resides in Ludwigsburg, Germany, has obtained a patent in this country on a new alloy. In order to improve the technological properties of aluminium without increasing its specific gravity, a proportion of four to seven per cent., phosphorus is, according to the present invention, added to the aluminium. The density and firmness of the same are thereby substantially increased and an extremely tough substance is obtained. An alloy of aluminium with phosphorus containing

the above-mentioned proportion of the latter forms an excellent substitute for tombac and all other similar alloys, gives a very sharply-defined casting, and only contracts to the extent of one to one and one-half per cent., at the utmost. Another thing in favor of this alloy is the fact that phosphorus is relatively cheap, compared, for instance, with magnesium. Moreover, there is the further advantage that its color is not blue, as is the case with alloys of aluminium and magnesium, but silvery. The facts that the alloy does not easily oxidize and that it can be soldered also deserve mention.

Are The Laws of Mechanics Exactly True?

Is mechanics an exact deductive science, to be taught like geometry: or is it based wholly on experiment, and to be so taught? The latter method obtains in England and the former on the continent of Europe generally. M. Poincare, the eminent French mathematician, in a paper read originally before the International Congress of Philosophy held at the Paris Exposition, maintains that the English are right. This paper, which has just appeared in the printed proceedings of the congress, is reviewed in the *Revue des Questions Scientifiques* (Louvain, Belgium). M. Poincare's position appears to be that the laws of mechanics are wholly deduced from experience, of which they are an ideal expression. We can not be convinced of their rigorous exactness though we are right to assume it for practical purposes. For instance to quote the review:

"A body that is subjected to no force can have only a uniform motion in a straight line. Such is the principle of inertia. * * * which is not an *a priori* truth: for if we say that the velocity of such a body can not change because there is no reason for it to change, could we not also maintain that the position of a body can not change without the action of some exterior cause? The principle of inertia is not therefore a self-evident truth: it is an experimental fact?"

The answer to this question must strictly be in the negative. All that we can say is that the more carefully we try the experiment and the more we remove obstacles, the nearer we come to demonstration. Again, take this principle: "The center of gravity of an isolated system can only have a uniform motion in a straight line." Can we verify this by observation? Evidently not, for no system of bodies is entirely isolated. Even the solar system is acted on by celestial bodies outside of it. We can, however, show that for a nearly isolated system the law is nearly true. M. Poincare states his belief that it is not only impossible to obtain a rigorous proof of such a law as this, but it is absurd to ask it. As there is no such thing in nature as an isolated system, the question has no sense. The author finally concludes that the principles of mechanics present themselves under two aspects:

"On the one hand, they are truths based on experience, and verified approximately so far as isolated systems are concerned. On the other hand, they are postulates applicable to the universe as a whole, and regarded as rigorously true. If these postulates possess a generality and certainty that do not attach to the experimental truths from which they are derived, it is because they reduce in the last analysis to a simple convention that we have the right to make, because we are certain in advance that no experiment will ever contradict it."—*The Literary Digest*.

Process of Manufacturing Steel.

A new process of manufacturing steel has been devised by two Englishmen named Thomas Andrew and Thomas K. Bellis residing, respectively, in Richmond and London, England. This invention consists in a process for the treatment of either Bessemer or open-hearth steels, whereby the same may be cheaply and efficiently converted into steel having a crystalline fracture of absolute regularity and fineness, and possessing the well-known qualities of "crucible" steel.

The salient feature of the process is the use of hydrogen as an element that will impart to the product of the Bessemer and open-hearth processes the qualities wanted. The affinity of this gas for metals is well known, and it appears that iron naturally contains it in greater or less quantity. It is the idea of the inventors that one of the prime reasons why Bessemer and open-hearth steels have not the high quality of crucible steel is that in the process of manufacture much of their hydrogen is lost. It is their object, therefore, to treat Bessemer and open-hearth steels with a view to recharging them with the lost hydrogen, and so imparting to them the superior quality of steels made after the more cumbersome and tedious crucible process. To this end, in carrying out the new process, Bessemer or open-hearth bars or billets are first heated in an ordinary closed air furnace. The billets, when at a bright-red heat, are quickly withdrawn, laid on a suitable support on a sand floor, and at once covered with a suitable bonnet, into which is injected a jet of pure hydrogen. By contact with the metal the gas will be ignited, serving to effect the exhaustion of what air is initially inclosed in the bonnet with the billets. When the air is completely exhausted, the metal remains in a bath of pure hydrogen gas, which it freely absorbs. The metal remains exposed to the gas for fifteen minutes, or longer, if desired. When the metal cools, the hydrogen is not only retained mechanically in combination by the closing of the pores or grain of the metal, but chemically; for the hydrogen absorbed has combined with the carbon of the metal. At this stage, therefore, a union will have been formed between the iron, the carbon, and the hydrogen, the latter acting as a binder between the other two. The homogeneity of the union is of course materially enhanced by the thorough opening of the pores of the metal, thus permitting a perfect exposure of the carbon to the hydrogen; but the union thus effected has not yet caused the quality of the steel to be improved, though the hydrogen is established in the composition with adequate tenacity, for it requires a melting heat to bring about its separation from the metal after having been once incorporated therein. The carbon, which is a fugitive element, under reheatings and temperings, is neither fixed nor crystallized consistently with the superior quality which the product is intended to possess. To quite perfectly fix and crystallize the carbon, therefore, the steel is next chilled. This is effected by first heating the billets to a white heat, if they are of low carbon, (10 per cent., or 15 per cent.,) or to simply a red heat, if they have above that percentage of carbon, and then cooling them in any suitable and well-known chilling-bath, which does not evolve oxygen, the latter having, as is well recognized in this art, a deleterious effect on the steel.

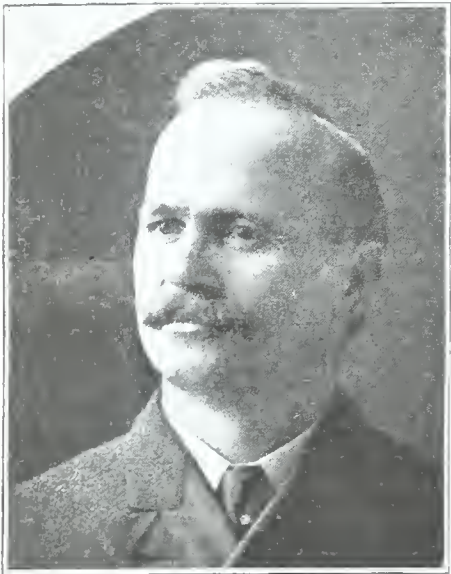
HENDERSON P. CHILDRESS, INVENTOR & MERCHANT.

A man who is a public benefactor has not lived in vain. To the extent that he has contributed to the welfare of the race, by the lightening of labor or kindred advantages, is honor due him and his success is deserved.

Such a man is the subject of this sketch. Mr. Henderson P. Childress, inventor, one of the most wide-awake, progressive and successful business men of Memphis, Tennessee.

We are all familiar with the story of the message to Garcia, that it was not so much a question of *how* as *do*. The efforts and achievements of H. P. Childress run parallel with the story.

Born in Monticello, Drew Co., Arkansas, January 2, 1867, he had the first requisite of a true man, namely, parents of good birth and sterling character. His education was obtained in the public school of Monticello and the Pine Bluff College, where he graduated at the age of 18 years. Ever loyal to the call of duty, Mr. Childress then assumed management of his



HENDERSON P. CHILDRESS.

widowed mother's plantation, and for three years looked exclusively to the comfort of the family and the interests of the plantation. Here he laid the foundation of studious thought and the habit of clear thinking which evolved the several useful patents before the public.

But a man may not hide his light under a bushel, and soon Mr. Childress was urged to accept the position of Deputy Sheriff of Desha County, Arkansas. This position, together with the management of his mother's plantation, he held for four years with credit to himself and satisfaction to the community.

Honorable ambition leads a man onward and upward. In the arena of the business world Mr. Childress wished to match his steel with his fellow man. He, therefore, sold all interests in Arkansas, and together with his mother and sisters, moved to Memphis. Here, without experience in a city, without influential friends, without a "pull," he applied to one of the leading stove and range firms of Memphis for the position of city drummer. Where others had failed, his personality, pleasant address and integrity won the day. He rose rapidly from

city drummer to store-salesman and then head salesman of the establishment. The firm retiring from business, the Langstaff Hardware Company lost no time in securing his services. After working for them three years, Mr. Childress opened a handsome store of his own for the sale of stoves, ranges and house-furnishing goods at No. 258 2nd Street, Memphis, Tenn., where at the present time he is doing a lucrative business.

Mr. Childress being conversant with every detail of his business, his inventive genius soon pointed ways and means of improvement on several appliances, hence the several valuable patents which he has perfected.

His first patent was a hub-securing device for vehicles, and without waiting for success to crown his first efforts he next patented a trace-fastener. This patent was secured through the reliable patent attorney, Mr. E. G. Siggers, of Washington, D. C. After the patent issued Mr. Childress made a trip to Washington and thence to New York to attend the National Carriage Dealers' Convention. Here his two patents were exhibited for eleven days, and the trace-fastener being a high class invention without nails or screws, was awarded a premium for simplicity and utility.

Mr. W. W. Carnes, one of Memphis' moneyed men, has purchased a half interest in the trace-fastener for foreign countries; and Messrs. Jas. Applewhite and Thos. L. Welleford, also prominent citizens of Memphis, have purchased a 40 per cent interest in the hub-securing device and trace fastener for the United States.

Mr. Childress is a natural mechanic and has several useful articles in process of construction. At the present time he has pending in the U. S. Patent Office, a most valuable patent, the Twentieth Century convenient typewriter cover. The writer had the pleasure of examining this typewriter cover, and it is safe to say that a more useful invention has not recently been put upon the market. Sales will invariably follow its exhibition.

Personally, Mr. Childress is modest and retiring, though pleasant and agreeable in conversation. He is strictly temperate: a member of the Methodist Church, a high member of the I. O. O. F. Lodge, and a man who deserves and holds the esteem of those who know him both socially and in business relations.

The Cause of Baldness.

A writer in a comic paper recently suggested that as microbes had been shown to be the cause of almost every known disease, it was in order for some one to discover the bacillus of baldness. He did not know that this very thing had been done, and that his joke was sober earnest. The microbial and contagious character of most chronic cases of baldness has now been well established. The disease has been thoroughly discussed by Dr. Sabourand in a recent book published in Paris, and some of his conclusions are given in *La Nature* by Dr. A. Cartaz. One of his most striking conclusions is that baldness, as a chronic malady, is a disease not of old age but of youth; in bald old men we simply see the results of a disease that has been slowly doing its work for many years.

[Patent Office. Continued from page three.]

great amount of ingenuity has been, and is still being expended, to make it as difficult as possible to "beat" these machines. They all contain devices to compel the operator to manipulate them in a certain way, and to attract the attention of the customer to the indicator. The cash register is a comparatively new invention, having been developed almost entirely within the last twenty years.

Voting machines are among the newest of the adding devices. These machines contain keys for the different parties and candidates, and counters which show instantly at the close of an election the number of votes received by each candidate. They also contain an elaborate set of locking devices, arranged so that a voter cannot vote twice for the same candidate, cannot vote for more candidates for any given office than he is entitled to, and in general so that it is a mechanical impossibility to cast an illegal ballot. These machines are slowly coming into use, and seem to promise much for honest elections.

One of the most wonderful of all the developments of this art is to be found in the United States Census Bureau. All of the counting and all of the analysis of census returns are done on automatic electric counting and assorting machines. These machines handle an amount of statistical matter which it would be impossible to take care of by any other means; with the result that the last census has been subjected to a far more thorough and exhaustive analysis than any preceding census in any country. This is essentially a modern art, and is now probably only in its infancy.

RECORDERS.

Recorders include devices for making a permanent marked or inked record of any motion or fact, and in this respect differ from Registers, the record of which is fugitive e. g., an ordinary water meter wherein the meter wheels and therefore the readings are constantly changing and leave no marked or inked record. Whereas, in the familiar instance of a recording thermometer, a permanent ink record is made of the motion of the hand or points of the thermometer.

Recorders are now used to plot or record the motions of almost every conceivable kind of device e. g., the motions of thermometer and barometer pointers, steam engine pistons, speed measures on cars, etc., in order to prevent an engineer from running his engine too fast. They are also used to automatically indicate when and where an engineer sounds his whistle, puts on his brakes, stops, how long he stops at a station, etc.

Recorders are also now coming into use to keep a record for cab owners of how far a cab driver goes during the day, how long and when the cab is idle, how many passengers have pressed down the seat in the cab, etc. There is a recorder now in use by the superintendent of one of the large railroad systems, that records so many facts, as the superintendent's train runs over the track, that a good idea of the condition of the track is obtained from the record made. The majority of the inventions examined in this class, however, relate to the recording of the time of entrance and departure of workmen to and from their work. These machines compel a workman to keep his own time account, and thus prevent disputes as to the accuracy of employers' records and also tend to secure promptness on the part of the employee.

ELECTRIC SIGNALING.

From the time of operating the first locomotive, it was found necessary to provide some system of signaling, whereby train engineers could be informed of the condition of the track ahead of them. By means of signals at the entrance to a block or section, the engineers were enabled to know if that portion of the track was clear, so they could proceed with safety, or whether it was obstructed by another train, an open switch, or possibly a broken

bridge or a landslide, necessitating a stop in order to avoid an accident. Various means have been employed for operating these signals, and one of the most efficient is an electric circuit, including some character of electric motor by which the signal is actuated: this motor being set in or out of operation by a train when it reaches the block or section guarded by the signal, either by making a short circuit, through the wheels and axles, or by closing a circuit through track instruments, or in any other appropriate manner.

Another line of invention in electric signaling, now very active, is that where, if it is desired to warn the engineer, a signal either visible or audible, is "set" in the cab of the locomotive, or of both engines, if two are on the same section. In connection with the last-named type of signal, the steam is sometimes automatically cut off and the air-brakes applied, thus stopping the train. The class of electric signaling also includes, besides railway signals, electric bells, electric indicators and electric recorders.

Mr. James T. Newton, the Principal Examiner of Division 23, was born in Morgan County, Georgia, was educated in the common schools and University of Georgia at Athens, Ga., and at the Georgetown Law School of Washington, D. C. After leaving college, Mr. Newton taught physics and chemistry in a branch of the University of Georgia; stood the examination for Fourth Assistant Examiner in 1890, was appointed in 1891, was promoted to Law Clerk in 1893, Chief Clerk in 1894, and Principal Examiner in 1895, and was assigned to Division 23, where he has been in charge ever since.

Mr. William J. Rich, First Assistant Examiner, is a native of Maine. Graduated in mining engineering from the Massachusetts Institute of Technology, also in law from Georgetown University, and is now taking a special course in patent law at Columbia University. He was appointed Fourth Assistant Examiner in May 1889 as a result of civil service examination, and became First Assistant Examiner in 1895. He has examined inventions in brakes, gins, carding, cloth finishing, etc., in Division 21, and registers, calculators, electric signaling, etc., in Division 23, and since January 1900 has been detailed to the Classification Division a large portion of the time, and has classified all the patents now in Division 23.

Mr. J. H. Lightfoot, Second Assistant Examiner, was appointed Fourth Assistant Examiner in 1886. He received his education at Bethel Military Institute, Va., and the Bliss Electrical School, and graduated in the law department of Columbia University. He is now in charge of the classes of Recorders, Acoustics, Fare Registers, and a portion of Electric Signals.

Mr. W. S. Chase, Second Assistant Examiner, is a veteran of the Civil War. Before his appointment in the Patent Office he was a practical watch maker, and has been in charge of the class of Horology since 1880. Two-thirds of the patents in this class have been examined by Mr. Chase.

Mr. Robert H. Strother, Third Assistant Examiner, is a native of California. He was educated at Cornell University, New York, was appointed Fourth Assistant Examiner in 1898, and promoted Third Assistant Examiner as a result of an examination held four months after his original appointment in the Office. He has had charge of the classes of Acoustics and Cash Registers since his entrance into the Office.

Mr. Edward N. Pagelsen, Fourth Assistant Examiner is a native of Michigan. He was educated at the Michigan Agricultural College and graduated in 1901 from the Law Department of Columbia University, and is now taking a special course in Patent Law at Columbia University. He has had charge of Calculating Machines, Combined Calculating and Adding Machines, and Voting Machines.

BULLET-PROOF CLOTH.

History of the Inventor and His Wonderful Invention.

THE inventor of the "Bullet-Proof Cloth" was born in Kaczanowka, Austrian-Poland, in the year 1869, of poor Polish parents. Having received his elementary education in his native town, he was anxious to continue his studies with the Jesuit fathers at their college at Tarnopol. His parents, however, could not afford this, being themselves too poor to defray the expenses connected with a higher education. He therefore concluded in the year 1887 to enter the religious community of the Resurrectionist Fathers as a lay brother, at Lemburg, Austrian-Poland. Here various duties were assigned to him, until the year 1890, when the Very Rev. Superior General of the Community summoned him to Rome, whom, after five months, he accompanied to Chicago, Illinois. Here the duty of sacristan was allotted to him at St. Stanislaus Church, one of the largest parishes in the world, numbering no less than 40,000 souls. He still continues to hold this office. The history of his invention dates back to the tragic death of Carter H. Harrison, Sr., the mayor of the city of Chicago, who was assassinated on the last day of the closing of Chicago's great world exposition in 1893. From that time on Zeglen began to ponder over an invention that would prevent men, exposed to the envy and malice of their fellow creatures, from falling victims to the merciless hand of the assassin. After four years of hard toil, he succeeded in his endeavor by discovering that silk is impenetrable to bullets. Before coming upon this discovery he tried various other materials, such as hair, straw, etc., but none seemed to give as perfect results as the higher grade silk material. The first public test of this bullet-proof fabric was made in the presence of the Chief of Police of Chicago and his assistants. It was next tried on a corpse, on a live dog and finally on the inventor himself and on Dr. F. H. Westerschulte, of Chicago. Other tests were made at Fort Sheridan, New York and at Springfield armory Massachusetts. All of these tests proved very satisfactory. On account of the numerous orders for the bullet-proof cloth, the inventor was unable to supply the demand, and not being able to find a factory in America that would be able to weave his cloth, he set out to Vienna in December, 1897, with the resolve of perfecting his invention. In Vienna, through the agency as well as at the expense of John Szczepanik & Company, likewise the co-operation of Mr. N. Reiser, director of the weaving school at Achen, the invention was improved to the extent that now the bullet-proof fabric can be weaved by means of machinery suited to the purpose.

While in Vienna, Zeglen presented his invention to the Austrian government to be tested. The test was quite satisfactory. However, the material out of which the bullet-proof cloth is made, being too expensive, the Austrian government could not afford to acquire it for the use of her army. After ten months sojourn in Europe, Zeglen returned to Chicago, Illinois. Here he presented the bullet-proof cloth, in the improved condition, to the city authorities. On July 8, 1899, the mayor ordered a new test to be made, which turned out most successfully, and that same evening during the session of the City Council, Alderman John F. Smulski introduced a resolution, that a number of these bullet-proof vests be procured for the city police. A

lighter than Zeglen's which could be adjusted so as to be worn by the individual soldier during battle.

Zeglen manufactures the bullet-proof cloth himself and sells it to sheriffs, detectives, policemen and other citizens of the United States whose occupations are of a hazardous nature.

The Chicago National Bank will pay a reward of five hundred dollars to any one who can prove that a revolver bullet will penetrate Zeglen's bullet-proof cloth.

In Europe, John Szczepanik is authorized to sell them to various officials of the different nations.

The invention of bullet proof fabric can be divided into three kinds.

The first wards off bullets from revolvers or shrapnels and shotshells

garments and devices for protection of life can also be easily manufactured.

The third kind of bullet-proof fabric is made of silk, again being a textile fabric, the thickness of which is one inch, covered on the outside by a steel armor of one sixteenth of an inch in thickness. The weight of the fabric is two pounds to the square foot. Thus silk and steel together weigh four pounds to the sq. foot. The complete armor wards off steel bullets from military rifles, at a range of 260 yds. The same steel bullets can be warded off at a range of 200, 100 and 50 yards, but the steel armor must be increased to the thickness of one-tenth of an inch and at a range of 50 yards to one eighth of an inch.

Various kinds of coverings can be made from the last or the third kind of bullet-proof armor. An armor can be manufactured to protect the chest and the abdomen, something similar to the chest protector for a catcher at a baseball game. Such an armor can be worn by almost every man in the army, to protect him at a range of 250 yards.

One thing must be remarked, that, as a rule among all the powers of the world, the range for military practice in shooting is never less than 400 yards, which is, moreover, corroborated by reports of the late Spanish-American war and of the present Transvaal war. This last kind of armor can be utilized in almost every department of the Army or Navy, not mentioning all the different devices for protection, which can be made for guns, wagons for ammunition and all kind of inventions in artillery.

The cost of the bullet proof fabric is as follows:

The first kind, per square foot \$5.75. A complete vest \$50.

The second kind, described above, \$14.00 per square foot.

The third kind, \$15.00 per square foot.



CASIMER ZEGLEN.

sum of money was appropriated for this purpose, but for the lack of funds the mayor has not yet issued any order to purchase them. In the meantime policemen are purchasing them for themselves out of their own funds.

On March 21, 1900, another test took place at Fort Sheridan with the improved bullet-proof cloth. Captain W. Bowend was shooting at a target of an inch thickness, from the distance of 200 and 300 yards with a 30-calibre Krag-Jorgenson rifle. From the 200 yard distance the steel bullet penetrated the target, the steel metal, however, of the bullet remained fixed in the third portion of the target. From the distance of 300 yards the bullet penetrated but half way and remained fixed in the other half of the thickness of the target.

Captain W. Bowend then tried a 38-calibre Colt-revolver, shooting now at the bullet-proof vest, from a distance of 5, 10, 15 and 25 paces and in no instance did the bullet penetrate the vest. Captain W. Bowend after these tests claimed that sooner or later this bullet proof shield will be introduced into the army, notwithstanding the expensive manufacture of it, because there has not yet been found a material

from sporting-rifles, at any distance.

The second resists leaden bullets from rifles such as the "Springfield" at any distance, likewise steel-bullets from military rifles, at a range of 800 yards.

The third resists all kinds of bullets from military rifles.

The first kind of cloth, which resists bullets from revolvers, shrapnels and sporting rifles, is made of silk-thread, the whole composition being a textile fabric. The thickness of the cloth is one-fourth of an inch and weighs half a pound to the square foot. The fabric is soft and flexible, so that all kinds of garments can be made out of it. The most practical form of garment is a vest. This can be worn in all seasons of the year if desired, to serve as a protection from murderous bullets, which, up to the present, have caused so many deaths.

The second kind of bullet-proof fabric is a simple textile fabric, being an inch thick and weighing two pounds to the square foot, and, as stated above, resists and wards off all kinds of leaden-bullets from military rifles at any distance, dum-dum bullets at a range of 400 yards, and steel bullets at a range of 800 yards. From this fabric,



There is no doubt that the invention will be of the greatest service to mankind, and in time of war make it possible for the soldier to protect himself against the bullets of the enemy. It was General Sherman who said "War is hell," and while the Zeglen invention will not altogether relieve war of its horrors, it certainly tends in that direction.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy: twenty copies for \$1.50.—Please give correct data in ordering.—Address

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Jar cover and fastener.....H. H. Stevens
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Paper hanging machine.....J. M. Glickman
Paper making machine.....J. H. Reynolds
Pencil.....C. V. Cuddip
Photographic fabric and preparing same.....P. M. C. Grenier
Photographic negatives, &c. Apparatus for judging the color and density of.....J. W. Dawson
Photographs. Automatic and instantaneous apparatus for producing.....F. D. Romani
Physician's examining chair and table.....R. P. Curtis
Piano vibrato sostenuto attachment.....H. H. Northrop
Picture frame.....R. Seebach
Picture hanger.....C. I. Still
Pin.....H. A. Kimball
Pipe coupling clamping ring.....F. N. Smith
Pistol. Magazine.....T. J. Bennett
Plane.....G. P. Davidson
Planter and cultivator.....J. R. Jones
Planter. Corn.....W. L. Bogle
Plaster of paris. Indurating.....A. Broodsky
Playing ball.....F. H. Richards
Plow. Electrically operated.....M. T. A. Kubierschky
Plow. Motor.....R. J. Galtin
Plow. Shale rock.....H. G. Butler
Plow. Sulky.....H. Sommerfeld
Pneumatic despatch terminal.....E. C. Phillips
Poke. Animal.....A. Axelton
Press mold for hollow articles.....W. J. Greenwood
Pressing, stamping, embossing, or printing flat surfaces. Apparatus for.....C. Huber
Printing. Invisible impression.....E. W. Hall
Printing machine. Stencil.....J. A. Ambler
Printing press delivery table.....E. M. Howell

Propeller. Hand power..... I. A. Wilson
 Pulley attachment. Split..... A. W. Hight
 Pulley. Lubricating..... W. Reid
 Pump balance attachment. Centrifugal. F. Ray
 Pump. Diaphragm..... W. F. Rannels
 Pump. Eccentric chain lift..... C. C. Buck
 Pump rod guide. Oil well..... C. F. Rigby
 Pumping apparatus. Well..... B. Winkelman
 Rail joint..... A. Eisenrath
 Railway. Marine..... C. M. Davis
 Railway rail..... E. E. Myers
 Railway rail joint..... A. A. Strom
 Railway signaling and communicating apparatus..... H. Gulliver
 Railway track special..... T. J. McTighe
 Raisin cleaning and assorting machine..... E. J. Kessler
 Refreshment receptacle and boutonniere..... J. A. Goetz
 Refrigerator..... A. B. Kokernot
 Refrigerator attachment..... A. B. Kokernot
 Rein holder and storm apron supporter. Combined..... W. H. Woodbridge
 Rendering apparatus..... J. C. W. Stanley
 Retort furnace..... D. Laird
 Roller die..... H. Herden
 Roller mill feeder..... H. Gschwendner et al
 Rope clamp..... C. F. Rigby
 Rotary engine..... I. V. Ketcham
 Rotary engine..... M. J. Hewlett
 Rubber devulcanizing india..... O. F. J. Duwez
 Rubber tired wheel..... R. Mulholland
 Rubbish storing removing apparatus..... S. Maschke
 Rule..... W. & O. G. Meyer
 Saud dischargers. Compressed air controlling device for..... J. Farley
 Sand drier..... J. A. Mumford
 Sash lock..... D. Hoyt
 Sash lock. Automatic..... F. George
 Sash. Revolving window..... C. D. Tabor
 Screw clamp. Temper..... P. H. Mack
 Seine pulsing machine..... W. B. Lantz
 Separating and bolting machine..... D. W. Marmon
 Sewer basin and trap..... C. F. O'Neil
 Sewing machine..... W. H. Beck
 Sewing machine felling and hemming attachment..... W. S. Jenkins
 Sewing machine hemming and cording attachment..... A. H. De Voe
 Sewing machine. Lock stitch..... M. Marx et al
 Sewing machine take up mechanism..... J. L. Kieffer
 Sewing machine tension mechanism..... J. L. Kieffer
 Shade roller bracket..... E. F. Kaiser
 Shaft or pole support..... E. B. Dikeman
 Shoe polisher..... J. F. Brougher
 Sign. Changeable..... T. P. Heinemann
 Sign. Electric light..... H. Tripp et al
 Signaling apparatus. Electrical hose..... G. G. Weitz
 Skirt lifter. Dress..... J. & K. M. Hammer
 Skirt supporter..... J. Mathison
 Soldering iron..... H. Geisenhauer et al
 Soldering machine. Can..... J. D. Cox et al
 Sparking plug..... H. C. Folger et al
 Spike drawing tool..... J. K. Reid
 Spike fastener and tire tightener. Combined..... E. Leveille
 Squeeze roll..... W. P. Denegre
 Stacker. Pneumatic..... D. Dow
 Stacker. Straw..... A. Hagemeister
 Station indicator..... J. A. Mead
 Steam and internal combustion motor. Combined..... F. D. Clark
 Steam boiler..... A. Spencer
 Steam boiler. Vertical tube..... F. Burger et al
 Steam in cylinders. Means for reducing condensation of..... G. R. Harvey
 Steam separator..... W. L. Jameson
 Steam trap..... W. H. & R. Thompson
 Stock..... E. J. Ryerson
 Stocking guard..... H. Weil
 Stove..... A. K. Beckwith
 Stove for the ventilation of rooms, &c..... H. Turk
 Stove gas burner..... H. J. Henry
 Stove or range. Cooking..... E. Clarke
 Stove shelf..... E. W. Anthony
 Stud..... P. Neumann
 Stump extractor..... C. R. Redman
 Stumps. Destroying tree..... J. J. E. McLelland
 Sugar. Converting cellulose into..... A. Classen
 Sugar mold. Maple..... J. M. Lyons
 Supporting or connecting means..... D. H. Warner
 Supporting tool..... A. T. Dudley
 Surveying instrument lateral adjuster..... C. L. Berger
 Sweeper. Rotary..... J. J. Hoppes
 Switch and plug receptacle box. Combined..... F. J. Russell
 Syringe..... R. H. Eddy
 Table leg joint..... E. Tyden
 Tag..... R. G. Hitt
 Tank lug..... C. S. Beebe
 Target trap..... L. A. Sherman
 Telegraphy. Wireless..... J. Burry
 Temperatures of heated substances. Apparatus for gaging..... E. F. Morse
 Temperatures of heated substances. Gaging..... E. F. Morse
 Tenoning machine..... J. A. Barnes
 Theatre. Miniature..... A. L. McCormick
 Thill coupling..... A. Paul
 Thill coupling..... M. F. Bishop et al
 Threshers and separators. Clover hulling attachment for grain..... C. Saylor
 Threshing machine. Grain..... W. Maloney
 Ticket. Pin..... J. P. Kuhns
 Tilting chair..... J. Ellenbecker
 Time recorder..... C. J. C. & C. A. Krumm
 Time recorder and signal. Watchman's..... J. B. Yeakle
 Tire. Bicycle..... R. L. Lewis
 Tire for vehicle wheels. Rubber..... J. M. Sweet
 Tire. Vehicle..... W. H. Ostrander
 Tire. Vehicle..... F. Tilmoney
 Tire. Vehicle..... C. A. Pettie
 Tobacco curing apparatus..... G. F. Hillman
 Tool. Compound..... C. Sandler
 Toothpick holder..... C. A. Yarni
 Top. Spinning..... H. C. Covert
 Track jack..... O. Fryk et al

Track wrench..... J. W. Morehouse
 Traction system..... F. J. Sprague
 Trolley catcher and retriever..... C. F. Wilson
 Truck. Adjustable..... M. E. Bailey
 Truck bolster. Railway car..... O. M. Stimson
 Truck. Car..... E. S. Woods
 Truck. Car..... E. A. Curtis
 Truck. Car..... W. M. Johts
 Trunk..... S. P. Levergood
 Trunk..... S. E. V. Seward
 Tube covering die..... P. H. Friel
 Turbine. Axial flow..... N. S. Bok et al
 Turbine. Compound steam..... H. F. Fullager
 Turning device..... G. H. Hildreth
 Turning machine. Wood..... W. T. Jones
 Type. Font of..... G. A. Godson
 Type founding matrix..... G. A. Goodson
 Type writer..... C. E. Maxwell
 Type writer cabinet..... W. Horrocks
 Valve..... S. Wilson
 Valve and switch apparatus. Combined..... E. C. Garland
 Valve apparatus for locomotives. Vacuum and water relief..... A. Spencer
 Valve. Balanced slide..... F. C. Charles
 Valve. Engine..... J. G. McCormack
 Valve. Piston..... W. Heston
 Vapor generator..... M. Castellan et al
 Vehicle brake..... 2 pats. W. G. Price
 Vehicle brake mechanism..... W. Winkler
 Vehicle frame. Self propelled..... A. A. Ball, Jr
 Vehicle ground wheels. Mechanism for transmitting power from..... C. L. V. Kinney
 Vehicle. Motor..... W. W. Robinson
 Vehicle. Motor..... E. J. Pennington
 Vehicle seat lock..... C. H. Lambert
 Vehicle toe rest..... L. B. Truslow
 Vending machine. Coin operated..... G. J. Morgan et al
 Ventilating apparatus..... L. G. Swanson
 Vessel. Non-refillable and non-reemptible..... R. Fyfe
 Waist lengthening device..... E. DeLaney
 Washing machine..... J. R. Hartman
 Washing machine..... P. Botz
 Water closet water supply apparatus..... V. J. Emery
 Water heater. Electric..... M. H. Shoenberg et al
 Water meter..... L. H. Nash et al
 Water purifying device..... J. M. A. Lacomme
 Water tube. Rotary..... A. S. Hughes
 Weaner. Calf..... J. J. Hesser
 Weevil or other insect destroyer. Boll..... J. S. Doak et al
 Weighing machine. Coin controlled..... G. F. W. Schultze
 Well and test boring machine. Portable tubular..... C. D. Pierce
 Whistle. Plural..... A. P. Hatch
 Windlass and warping winch. Combined..... J. R. Andrews
 Windmill..... W. Bauer
 Window..... J. Fryer
 Window-screen..... C. J. Obermeyer et al
 Window screen..... H. T. Wright
 Winker stay fastener and holder..... A. L. Archambeault
 Wire reeling and stretching machine..... H. C. Land
 Wire reeling machine..... W. O. Dunlap
 Wire stretcher..... J. A. Walls et al
 Wire stretcher and cutter..... J. A. Armour
 Wooden butter dishes, &c. Machine for making..... G. R. Ibach
 Wrench..... R. A. Breul
 Wrench..... G. B. Howard et al

DESIGNS.

Belt..... L. A. Myers, Jr
 Belt. Apparel. 2 pats..... O. A. Lehman
 Cabinet. Wall..... E. Larrabee
 Cloak..... H. Mayer
 Clock case..... H. Jacobs
 Gas arc light..... H. E. Franke
 Gear casing..... C. W. Hunt
 Glass dish..... W. C. Anderson
 Lamp fixture..... T. M. Jamison
 Pattern. Dress skirt. 6 pats..... H. Guidez
 Picture frame..... E. Goette
 Spoon..... F. P. D'Arcy
 Type. Font of..... J. W. Phinney
 Type. Font of printing..... H. Ihlenburg
 Violin case..... N. E. Kennedy

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Abdominal support..... I. E. Palmer
 Accumulators. Charging..... R. E. Ball
 Accumulators. Means for charging..... R. E. Ball
 Advertising device..... J. S. Druar et al
 Advertising device..... J. E. Church et al
 Air brake..... J. E. Normand
 Air compressor..... F. L. Reeder et al
 Air ship propeller..... C. Groombridge
 Amalgamating machine..... 2 pats. G. C. Scott
 Ammunition. Loading tray for transferring..... J. Becker
 Anchor..... J. G. Watson
 Anchor. Ship's..... F. W. Kenney
 Animal trap..... J. Chagnot
 Antislipping device..... D. M. Dearing
 Armor plate. Manufacture of..... G. Charpy
 Asphalt. Preparing..... A. Wolskel
 Automatic brake..... M. A. Beck
 Automatic motor..... C. J. Slaughter
 Axle. Self lubricating..... M. Bruner
 Bank. Savings..... F. G. McPherson
 Bars, &c. Machine for forming..... W. Baisch
 Battery..... W. C. Banks
 Bed bottom. Wire..... J. Hoey
 Bedstead. Extension..... W. E. Pack
 Beet puller and topper. Sugar..... C. W. Bradley
 Belt and shirt waist connector..... J. N. Cunningham
 Belt guide..... C. McKeen et al
 Bicycle and tricycle..... G. A. H. Pietsch
 Bicycle gear..... E. M. Davis
 Bicycle hubs. Adjustable cone for..... A. S. Reed
 Blast furnace..... G. P. Herrick
 Boat. Submarine..... J. P. Holland
 Boat transferring mechanism..... L. Donne
 Boats from ships. Apparatus for launching life..... C. F. Petersen
 Boiler tube cleaner..... C. T. Demarest
 Bottle carrier..... O. F. Clark
 Bottle filling machine..... E. Figueredo et al

Bottle filling machine..... L. Strebel et al
 Bottle. Non refillable..... J. W. McCracken
 Bottle stopper..... A. Stern
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 Box..... L. J. Burdick
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 Brake shoes. Device for compensating for wear in hydraulic..... A. Goldschmidt
 Bran packer..... J. S. Cameron
 Brush..... F. H. Tucker
 Bubble blower. Soap..... C. E. Alhart
 Buttons, &c. Machine for making..... W. B. Alden
 Cage press..... J. H. Hubbell
 Calender roll grinding machine..... J. Linton
 Cam. Stamp mill..... J. C. H. Vaught
 Can steaming machine..... C. S. Bucklin
 Can top and cap..... J. B. Stewart
 Cans. Means for cooling milk..... S. C. Sullivan
 Canning apparatus. Food..... G. Lees
 Candle holder..... C. Bogendoerfer
 Cane. Flag..... J. W. Freeborn
 Cane. Magazine torpedo..... J. H. Fox
 Car brake..... F. F. Shaffer
 Car coupling..... T. J. Sammons
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 Car pusher..... E. C. Boyer et al
 Car roof..... C. M. Jennings
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 Car street indicator. Street..... J. C. Wuerth
 Car. Tram..... E. A. Stanley et al
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 Cars, &c. Folding step for..... E. J. Hunt
 Cars. System of operating fans by power for ventilating passenger..... R. M. Dixon
 Carousel..... W. Johnson
 Carriage. Folding..... C. E. Fanning
 Cart shovel and scraper..... A. Gehring
 Cash carrier..... D. Lippy
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 Chain link..... A. Palmros
 Chain link..... T. G. Aultman
 Chair..... A. M. Smitz
 Change receiver..... C. V. Smith
 Chimney ventilator..... C. D. Smith
 Chopping knife. Culinary..... E. C. Phillips
 Churn..... F. W. Lippold
 Churn..... J. Groendyke
 Churns. Mechanism for operating vibrating..... M. Cooper
 Cinnamic ether of cinchona alkaloids..... H. Thron
 Circuit controller..... E. M. Hewlett
 Clock key holder. Watchman's..... A. Beyer
 Clothes line and peg holder or clamp. Combined safety..... T. Grundy
 Clutch..... H. L. Henderson
 Clutch. Friction..... A. E. Norris
 Clutch operating device..... G. L. Holmes
 Coaster brake. Vehicle..... R. E. Hammer
 Coffee. Means for roasting..... E. Boyes
 Coin delivery device..... J. M. Butcher
 Coin freed apparatus for delivering sweets, &c..... E. A. Jeffreys
 Colum step..... T. J. Younglove
 Communion service. Individual..... C. P. Harris
 Conduits. Means for inserting cords or the like into underground..... L. J. Bergdoll
 Contribution box..... E. A. Burus
 Coop. Folding chicken..... F. M. Steuterman
 Copper nickel sulfid ores. Treating..... D. P. Shuler
 Core bar. Collapsible..... J. D. Harless
 Cornstalk cutter..... N. C. Krauss
 Crate. Folding..... A. J. Noltz
 Creamer. Centrifugal..... H. Reck et al
 Cross tie. Metallic..... J. J. Wagoner
 Cross tie, track fastening, and rail joint. Combined..... G. L. Kimberly
 Crushing roll drive mechanism..... A. M. Acklin
 Cuff holder..... P. Cumming
 Cultivator..... G. T. Willis et al
 Cultivator. Beet..... J. W. Shields
 Cultivator fertilizer distributing attachment..... S. Tannahill, Jr
 Cutter bar..... D. E. White
 Damper..... R. G. Latham
 Dandy roll cleaner..... W. W. Weaver et al
 Dash pot..... W. A. Heywood
 Dental appliance..... G. H. Claude
 Desk..... W. J. McDewitt
 Diamond cross cutting machine..... G. Armeny
 Directory. Cabinet..... G. W. Maxwell
 Directory, &c. Mechanical..... G. W. Maxwell
 Directory. Mechanical. 5 pats..... G. W. Maxwell
 Dish making machine..... C. Anderson
 Door fastener. Sliding..... J. H. Kinter et al
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 Dough cutting machine scraper..... J. L. Causey
 Drains and sewers. Mode of and means for ventilating and flushing house or other..... I. Shone et al
 Dredging apparatus..... P. E. Nolan et al
 Drum or barrel head..... J. L. Shepard
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 Edge setting machine..... H. A. Oldershaw
 Electric circuit protector..... C. A. Rolfe
 Electric circuit regulating device..... G. P. McDonnell
 Electric circuits. Automatic safety switch for..... O. L. Plumtree
 Electric controller..... F. E. Case
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 Electric distribution system..... C. P. Steinmetz
 Electric elevator..... A. M. Modry
 Electric machines. Regulation of dynamo..... T. W. Williams
 Electric motor controller..... W. B. Potter
 Electric motor starting device..... R. H. Read
 Electric motors. Controlling..... M. W. Day
 Electric switch..... G. W. Hart
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 Electric switch..... G. B. Painter
 Electrical energy. Means for transmitting..... J. E. Woodbridge
 Electrolytic apparatus..... F. McDonald
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 Embroidering machine pattern mechanism..... D. Nadel
 Engine..... W. D. Linscott
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 Engine speed regulator. Explosive..... J. S. Klein
 Engines or motors. Mechanism for utilizing the power of..... H. W. Schlomann
 Engraving machine..... W. S. Eaton
 Envelop..... J. Lucas
 Evenor. Doubletree..... L. A. Tweedy

Eyelet..... F. J. Leland
 Farm gate..... A. B. Clayton
 Farm gate..... G. R. Clarke
 Feed and water device for chickens..... G. C. Lathrop
 Feeder for young calves or colts..... R. A. Whitford
 Felly. Vehicle wheel..... C. B. Van Horn
 Fence..... L. D. Peak et al
 Fence machine..... L. D. Peak et al
 Fence post..... C. W. Snook
 Fencing. Woven wire..... J. M. Denning
 File. Account..... L. J. Krohn
 Filtering and lubricating apparatus. Oil..... J. B. Allfree
 Firearm sight..... C. J. Hamilton
 Firearm single trigger mechanism..... G. E. Witherell
 Fire escape..... H. Boettcher
 Fire extinguishing apparatus..... C. Nuhring
 Fire kindler and method of making..... A. F. Putnam
 Firing valve for subsurface expulsion tubes..... J. P. Holland
 Flood gate..... J. H. Ogle
 Forge fire pot. Blacksmith's..... D. D. Reese
 Fruit drier tray..... J. H. Collins
 Fruit grading machine..... A. H. Pettit
 Fuel block and briquet..... F. Chailly
 Furnace..... J. MacCormack
 Furnace grate bar. Forced blast..... F. Burger et al
 Game apparatus..... M. V. Hammack
 Garment stretcher..... E. Pickhardt
 Garment supporter clasp..... T. P. Taylor
 Gas and oil burner. Combination..... G. A. Smith
 Gas capsule..... G. A. Logan
 Gas generator. Acetylene..... E. J. Dolan
 Gas generators. Carbide feeding device for acetylene..... W. E. Scofield
 Gas heater..... C. W. Claybourne
 Gas lighting apparatus..... C. Fader
 Gas making apparatus..... H. Spencer
 Gas producer..... E. J. Duff
 Gear. Transmitting..... J. S. Copeland
 Gearing. Variable speed..... L. E. Krotz
 Glass. Roller for rolling and ornamenting sheet or plate..... L. Appert
 Golf balls. 7 pats..... E. Kempshall
 Golf balls. Manufacture of..... 2 pats..... E. Kempshall
 Golf stick..... F. L. Slazenger
 Governor. Steam engine..... J. B. Allfree
 Grain flow indicator..... C. C. Neale
 Grinding or polishing machine..... A. Crocker
 Gun sight..... R. Chesnut
 Handle for a number of implements..... T. G. Moser
 Handle locking device. Swinging..... E. Baumann
 Hanging and fastening device..... A. Schluter, Jr
 Harness hook..... C. W. Hodges
 Harrow tooth fastening..... G. T. Willis et al
 Harvester bundle carrier..... H. Green
 Harvester fly wheel..... G. L. Phelps et al
 Harvester reel..... C. W. Priestley
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 Hat block..... C. Muller
 Hat box. Folding..... E. C. Beecher
 Hats. Drying..... J. Marshall
 Hay rake. Sulky..... A. R. Black
 Hitching device. Horse..... A. W. Swanberg
 Hog trough..... F. B. Davis
 Hoist..... D. E. Rowland
 Horseshoe..... J. Riley
 Horseshoe. Nailless..... J. W. Morse
 Horse tail holder..... H. E. Gavitt
 Hose supporter..... C. H. Wheeler
 Human body. Instrument for cooling or for warming internal portions of the..... R. E. Smith
 Hydrant..... R. E. Henderson
 Hydrocarbon burner..... L. C. Graessle
 Incandescent burner mantle..... D. J. Prendergast et al
 Inhaler. Pocket..... H. J. Valentine
 Insulator..... W. H. Nichols
 Insulator for high potential currents..... R. Gaertner
 Iron or steel. Apparatus for making..... E. Meininghaus
 Jar attachment..... G. E. Bateman
 Jar closure..... W. Sindorf
 Jar stopper..... L. Lohrmann
 Jeweler's stool..... R. H. Wade
 Journal box..... T. H. Symington
 Junction box..... M. F. Whiton
 Junction box coupling..... M. F. Whiton
 Knitting machine..... G. E. Ellis
 Knob attaching device..... G. B. Pickup
 Lace fastener..... A. H. Andrews et al
 Ladder. Extension..... C. B. Totman
 Lamp. Electric arc..... J. Eberhardt
 Lamps. Controlling arc..... E. Oxley
 Lamps. Controlling electric..... E. Oxley
 Lantern. Railway..... I. Love et al
 Last and union therefor. Transversely divided boot or shoe..... A. D. Tyler, Jr
 Latch. Door..... W. H. Wisley
 Lathe attachment..... J. E. Mills
 Lathe pan device..... H. C. Osborn
 Lawn rake..... W. L. Frisbie
 Leading spindle..... O. Sundt
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 Life guard..... T. E. C. Wilson
 Life preserver..... H. Prevost
 Lighting..... R. Thayer
 Lighting. Air pressure system of..... J. E. Raff
 Lock and latch. Combined..... L. H. Mullikin
 Loom. Filling replenishing..... J. Nothrop
 Loom pile wire head..... H. L. Matton
 Loom shuttle. Self threading..... J. Northrop
 Loom warp stop motion..... H. J. Jarry
 Match box..... G. Greenland
 Matrix for making gramophone, zophonon, or similar records..... B. Kaplan
 Mattress filler..... G. W. Wareham
 Mattress or cushion and heating attachment therefor..... A. Schmied
 Measuring and recording measurements of material. Mechanism for..... J. Hall
 Measuring can. Closed..... C. H. Weber
 Measuring instrument..... I. B. Hagan
 Meat hook..... A. T. Clark
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 Mechanical movement..... E. Horton
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 Molds. Forming sand..... 2 pats. S. J. Adams

Molding apparatus. C. M. Day
Molding apparatus. Sand. 2 pats. J. Adams
Mop wringer. F. W. Towne
Mortising, tenoning, and grooving machine. J. Clarke
Motion mechanism. Variable. A. B. Tenney
Mower. Lawn. C. D. Spates
Mowers, reapers, &c. Cutting apparatus for. H. L. Hopkins
Music rack. R. W. Mills
Necktie fastener. W. H. Hart, Jr.
Nut lock. N. J. McLean
Nut lock. D. J. Sullivan
Nut lock. R. S. Boykin
Nut lock. S. Benson
Nut lock. W. S. Sutherland
Oil burner vaporizer, mixer, and regulator. G. H. Larkin
Oil cup. B. M. W. Hanson
Oil cup. 2 pats. W. E. S. Strong
Ore separator. J. M. McClave et al
Ores. Apparatus for the treatment of. E. L. Sharpneck
Organ. Automatically operated reed and pipe. J. W. Crooks
Paper bordering machine. E. A. Wayt
Paper pail. W. G. Haas
Paper with glazed surface. Manufacture of water and fat proof. H. Herfs
Peas, &c. Blanching. C. H. Plummer
Peg cutter. J. A. Holmlund
Pencil sharpener. E. Burke
Pens. Machine for grinding and polishing steel or other metallic. J. W. Milligan et al
Piano player. Automatic. F. C. White
Picture frame. F. A. Buechner
Picture frames. Machine for mounting ornamental composition directly upon circular (reissue). F. E. Adams
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Piston guiding and packing device. J. B. Allfree
Plant destroying implement. J. Ludwig et al
Planter. Corn. W. S. Graham
Plow. J. P. Barnes
Plow. Disk. J. M. W. Long
Portable house. C. P. Mott
Potato pick up. W. A. Wiley
Powder distributor. J. A. Stuart et al
Power transmission mechanism. Fluid. J. Harding, Jr.
Press. W. L. Spaulding
Printing attachment for flour packers. H. P. Smith
Printing machine. E. Jensen
Printing machine web guide. O. Roosen
Printing press. Multicolor. I. E. Caps
Propeller shaft brake. G. Whittlesey
Pulley key. Self tightening. E. Wiggins
Pump. E. Warren
Pump. Rotating cylinder. R. Richardson
Pump vent closing valve. J. E. Penner
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Puzzle. W. W. Frisbee
Rail brace. J. E. Graham
Rail support. G. E. Oatman
Railway automatic couplings. Lock lifter for. T. Welch
Railway coupling. A. Wuthe
Railway. Electric. W. B. Potter
Railway rail bearing. Parallel. M. I. Gilbert
Railways. Signaling system for single track. W. W. Salmon
Ram. C. C. Wentworth
Reading stand. J. Kriwanek
Refrigerating system. W. F. Singer
Rein support and holder. J. S. Wakefield
Reversing mechanism. J. B. Allfree
Roasting furnace. L. T. Wright
Rock drill making, mending, and sharpening tool. G. J. Glossop
Rocking chair. Folding. W. T. Seerup
Rotary engine. F. G. Bates
Rotary engine. J. P. Shepard
Rotary engine. W. H. Dougherty
Rotating piston engine. J. Dow
Routing or engraving machine. 2 pats. W. S. Eaton
Rubber article. Hollow seamless. T. W. Miller
Rubber scrap. Utilizing waste. T. Harmer
Rubber working machine. J. H. Pearce
Saddle. Harness. M. Wilson
Sand screen. S. W. Dow
Scale. Computing. F. E. Mefford
Scale. Proportionate. G. R. Brown
Scale. Weighing. O. O. Ozias
Scarecrow. A. C. Davis
Screen. G. W. Cross
Screens. Means for hanging. C. Rowland
Screening crushed ores or other materials. Apparatus for. W. McDermott
Screw adjustment. Feed. J. Doney
Seal applying machine. Bottle. 3 pats. E. D. Schmidt
Seal. Snap. E. J. Brooks
Seed delinter. Cotton. J. M. Gardner
Seed drill and cultivator. Combined hand. H. K. & H. A. Bacon
Seine pursing machine. 2 pats. W. B. Lantz
Sewed signature. W. G. Trevette
Sewing device. Broom. T. H. Brown
Sewing machine driving mechanism. S. Borton et al
Sewing machine. Fur and glove. M. Hashfield
Sewing machine loop taking mechanism. H. R. Tracy
Shade and curtain fixture. Window. E. W. Schneider
Shade rod hanger. Window. C. H. Bacon
Shade roller and curtain pole bracket. Combined. L. Bloom
Shade rollers. Bearing bracket for vertically adjustable. C. P. Thomas
Shears. H. F. Camp
Show stand or rack. Revolving. H. F. Palmer
Shutter. Focal plane. L. Moretti
Shutter operating device. W. W. Van Duzer
Sifter. J. E. Mueller
Signals. Apparatus for the transmission of. C. E. Beach
Skylight. A. N. Staples
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Smearing preventing device. O. Roosen
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Spinning device. C. W. & A. Mettler

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Spinning or twisting machines. Truing up the drawing rolls of. F. M. Marcy
Spool and producing same. E. Hubbard
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Steam engine. P. B. Whitney
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Thill support. W. D. Smith
Thread cutter. A. D. Marble
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Threshing machine feeder. T. E. Mahoney
Threshing machine governor mechanism. T. E. Mahoney
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Tire setting machine. Rubber. J. K. Williams
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Transformer. A. R. Everest
Tripod or stand. 2 pats. C. W. Howard
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Typer. Cupola furnace. S. F. H. Watt
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Vehicle, cycles, &c. Variable speed gear for motor. J. R. Madan
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Warp stop motion vibrator. A. K. Pratt
Wash boiler handle. Z. T. Hall
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Water balance. Automatic. A. Hoberrecht
Water closet seat. Lock. W. C. Miles
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Water elevator. Compressed air. J. R. Ricketts
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Ridet. F. A. Wells
Bidet. F. A. Wells
Glass vessel. Cut. F. C. Parsche
Lamp. P. Pause
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Spoons, &c. Handle for. H. H. Burdick
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Watchcase. H. V. Degoumois

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Air moistening apparatus. Automatic. W. W. Pratt
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Alloy. W. Rubel
Amusement apparatus. H. F. Schrader
Animal shears. S. W. Allen
Apparel. Wearing. I. W. Collins
Assaying apparatus. Ore. W. T. Armstrong
Automobile. H. K. Holman
Automobile frame. G. A. Hunt
Axle spindle. T. De La Mare

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Baler and rake. Hay. J. H. Symank et al
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Bearing. Axle. O. C. Kripe
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Bearings. Machine for grinding. H. La Casse
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Bell ringer. Magneto. E. E. Yaxley
Belt adjuster. A. Coulter
Belt. Lady's. E. Oldenbusch
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Billiard ball. E. Kempshall
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Book holder. C. E. Moulton
Book section having wide and narrow leaves. A. O. & E. R. Kittredge
Book stub holder. Check. W. H. Hawkins
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Bottle. Non-refillable. F. Klein
Bottle. Non-refillable. J. Y. Payton
Bottle or jar press. J. Haley
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Bottle washing machine. H. S. Brewington
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Brush holder. N. C. Bassett et al
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Buckle. Belt. A. E. Lee
Buckle chafe. W. Rauman
Buckle. Tug strap. W. H. Rose
Burglar trap. Safe. M. Elmer
Burner. T. Stites
Bushing for screws, &c. Anchor. W. S. Smith
Bushing for sheaves. Roller. C. E. McIntire
Button. Flexible shank collar or cuff. J. N. Crabb
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Calculator. Mechanical. W. H. MacCollin
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Can body bottom and crimper combined. H. C. Black
Can body ending machine. H. C. Black
Can body flanging machine. W. J. Kenny
Can body forming and soldering machine. H. C. Black
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Cap. Dynamite detonating. A. B. Hoover
Car. Automatic dumping ore. C. H. Snow
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Car door and grain door combined. W. H. Doerner et al
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Carpet fastener. Stair. J. S. Iardine
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Caster. G. B. Magoun
Casting apparatus. A. M. Acklin
Casting mold. Brake shoe. A. Brake
Cheese box trimmer. H. W. Quade
Chopping knife. Hand. A. A. Flagg
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Cigar wrapper cutting machine guide plate. N. Du Brul
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Circuit closer safety device. F. Mackintosh
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Clamping device for work benches. H. Gokel
Clay hydraulic pipe, vases, crock ware, &c. Strengthening. L. Millet
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Coat hook. Safety. W. H. Corbett
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Conduit. W. Houghton
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Conveyer. J. Oldham
Cooking utensil. H. Giesel
Cork extractor. R. J. Williamson
Corner piece trimming machine. F. Latulip
Corner post, transom bar, or mullion. J. Goldsmith
Corset and bust form. Combined. C. H. Schopbach
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Crane. Metallurgical. D. W. Blair
Crane. Portable. G. F. Speer
Crate. Folding. B. J. Casterline
Cream separator. A. D. Ellis
Cream separator. C. L. Morris
Cremating or incinerating human bodies. Furnace for. H. O. Kuehne
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Curtain fixture. A. E. W. Dunfield
Curtain stretcher. F. Violette
Cutting edges of implements. Rendering sharp and even. O. Newhouse
Dampener controller. D. H. Darrin
Dampener. Fireplace. S. Shaw
Dash pot. M. R. Moore
Devulcanizing apparatus. L. A. Stelzer
Distilling apparatus. Water. A. J. Chase
Door and frame for air tight chambers. S. P. Stevenson
Dovetailing machine. J. J. Blackman
Draft equalizer. J. N. Schwalen

Draft equalizer. G. Linhard
Draft equalizer. H. J. Heider
Drawer for sewing machine stands, &c. S. H. Wheeler
Drawer guide. W. H. Gercke
Drawing board. E. B. Jarvis
Drawing implement. F. A. Alteneder
Dredger, excavator, and elevator. Hydraulic. G. L. Cudner
Drilling machine. C. A. Wessman
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Edger guard. Gang. E. E. Thomas
Egg separator. A. L. Walker
Electric controller. F. E. Case
Electric furnace. M. R. Conley
Electric machine. Dynamo. E. J. Berig
Electric motor controlling device. W. B. Potter
Electric transmission of power. E. M. Fraser
Electrical condenser. G. F. Mansbridge
Electrical control system. G. T. & L. Woods
Elevator boots. Removable tray for. J. M. Lemmon
Elevator system. Electric. J. D. Ihlder
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Engine mixer or vaporizer. Hydrocarbon. B. Settergren
Evaporating pan. J. H. Hill et al
Exhibiting case. Thimble. A. H. Peal
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Fan. J. J. Wood
Fan. Electric. 2 pats. J. J. Wood
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Faucet. J. C. Poetz
Faucet for fluids. Compound. C. G. Loygorri y Murrieta
Filaments. Apparatus for the production of fiberless. W. A. P. Werner
File and display book. H. Zevy
Fire arch. H. A. Poppenhusen
Firearm lock. O. F. Mossberg
Firearm. Revolving. O. F. Mossberg
Fire escape. J. T. Mahar
Fire extinguishing compound. J. B. Miller
Fire extinguishing device. W. Doll
Fishing gear. A. W. Wilson
Food chopper. H. K. Wood
Frame. E. Oldenbusch
Fruit drier. L. Van Scoyck
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Fuse cut out. Plural. C. J. Dorsey
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Garbage or refuse can. E. R. Gilman
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Garment supporting appliance. J. P. Conway
Garter. D. B. Littlefield
Gas and air mixing burner. W. J. Woodward
Gas burner. H. Eldridge
Gas burner. J. Harris
Gas fire appliance. J. F. Hewitt
Gas generator. Acetylene. C. E. Drake
Gas generator. Gas engine. G. W. Bonds
Gas producer. L. Mond
Gas purifying agents. Making. H. S. Blackmore
Gate. W. M. Plaster
Gate opener. C. F. Lee
Gearing and casting therefor. Combined. H. B. Keifer
Gearing. Differential. W. G. Caffrey
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Glassware finishing machine. W. R. McCloy
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Glove fastening. W. B. Murphy
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Golf ball. 7 pats. E. Kempshall
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Grain binder. Automatic. J. F. Appleby
Grate. G. R. Prowse
Grinding machine automatic work rest. A. B. Landis
Grinding machine. Drill. H. P. White
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Gun shield attachment. J. F. Meigs
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Head rest. Folding. A. Rikli
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Tubular boiler..... J. A. Steinmetz
Turning machine. Wood..... W. J. Cochran
Type casting machine..... F. Lucke
Type writing machine..... G. J. Barrett
Type writing machine..... L. S. Burridge
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Type writing machine copy holder and line indicator..... F. C. Shobert
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Vaccinations, &c. Shield for..... J. E. Lee
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U. S. PATENT OFFICE DIVISION XXIV.

SEWING MACHINES, WEARING APPAREL, TENTS, CANOPIES, UMBRELLAS,
CANES, AND TOILET ARTICLES.

With fingers weary and worn,
With eyelids heavy and red,
A woman sat, in unwomanly rags,
Plying her needle and thread—
Stitch! Stitch! Stitch!
In poverty, hunger, and dirt;
And still with a voice of dolorous pitch
She sang the "Song of the Shirt!"

THIS was the photograph of the London sewing woman, as the poet showed it to his countrymen at the end of the eighteenth century. What is the companion picture in these opening days of the twentieth century? Instead of the "stitch! stitch! stitch!" of the woman in tatters and rags plying her needle and thread, the present-day student of the social problem finds great factories employing thousands of tidy operatives, assembled in well-lighted and ventilated rooms, in the midst of whirring, power-driven machines, cutting great bolts of linen and muslin fabrics up into patterns, stitching the assorted patterns into garments, in thousands and tens of thousands of dozens per day and millions per week, each machine running up the seams at the rate of four thousand to forty-five hundred stitches per minute, and tirelessly capable of continuing this speed for as many hours as the day is

long! Think what this rate means: forty hundred stitches every sixty seconds of time! Sixty-six perfected stitches in each second! Or, take it the other way: if each linear inch of seam contains twenty stitches, four thousand stitches will make two hundred inches, or sixteen and two-thirds feet of seam in a single minute! And, for use in the family, where the making of garments is not the sole occupation of the mistress, we find the modern family sewing machine, equipped not alone for high speed but, by the aid of a great variety of most ingenious special attachments, capable of better accomplishing the manifold forms of fancy work called for by modern art than is possible to the unaided needle, even in the skilled hand of the most gifted needle woman.

The classification of the Patent Office shows more than seven thousand patents grouped as improvements in sewing machines. Those are divided among sub-classes which bring analogous improvements together as nearly as may be. The important feature upon which is based the successful sewing machine is the eye-pointed needle, patented by Elias Howe, in 1846. Prior to that date various ineffectual attempts had been made, both in this country and in Europe, to produce a machine to make stitches in a fabric. But success was not achieved until the happy thought of Howe transposed the eye from the heel end of the common hand-needle to its point end. And yet inventors, as early as the latter part of the eighteenth century and the first half of the nine-

teenth, had employed the crochet or hook needle in machines to pull a sewing thread through plies of fabric to make stitches. In England this was done by Thomas Saint, in 1790, and in France by Tnimmonier Brothers, in 1830.

When, however, the eye-pointed needle of Howe showed the way, the modern sewing machine was born. But one important improvement was wanting: and this was supplied by A. B. Wilson, in 1852, in his invention of the four-motion feed. With these two improvements, the type of machines for uniting two or more plies of fabric was completed. The eye-pointed needle, means complementary thereto to enchain or lock the loop thrown out thereby, means to control the tension



DIVISION XXIV OF THE U. S. PATENT OFFICE.

of the thread and to set the stitch, and the four-motion feed device to advance the work—this was the modern sewing machine.

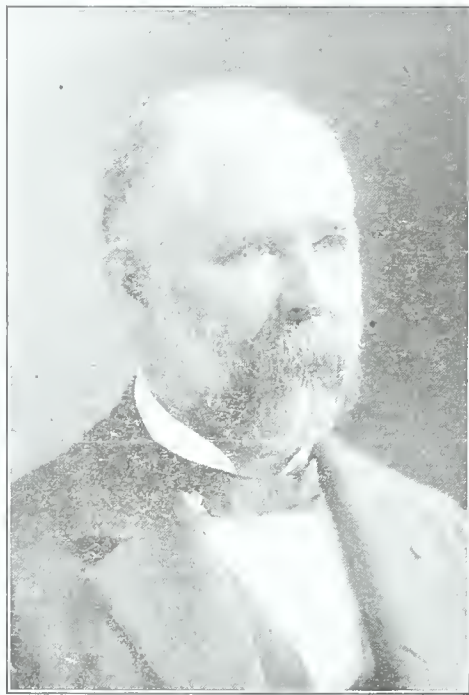
Save only the telephone invention of Alexander Graham Bell, the four-motion feed device of Wilson has proved the greatest money producer of any patent ever issued by the United States Patent Office. For, early in its history, in 1856, it became the ground of a "trust," or combination, between the four great companies, at that time dominating the sewing machine manufacture, viz:—the Wheeler & Wilson and the Grover & Baker S. M. Companies, I. M. Singer & Co., and Elias Howe, Jr. Without license from this combination, no sewing machine could be made: for, until the Job A. Davis needle-feed was invented, in 1866, it was the only practical feeding device possible to any operative sewing machine. It has been estimated that the Wilson four-motion feed device, during the twenty-eight years of its life, produced more than thirty million dollars to its owners.

The expiry of the patent for the broad principle of the Wilson feed, in 1877, gave a great impetus to the manufacture of sewing machines as well as a drop of nearly one-half in the price of machines to the public. Factories were established in every direction and improvements greatly multiplied. When it is realized that there are twenty millions or more of families in this country alone, and that most of them require at least one sewing machine, and many of them more, it is easy to realize what a vast number are required, year by year, to supply the demand—and a demand which is constantly growing. One company alone, in this country, turns out over a half-million complete machines each year. But the power-driven machines for factory use are in constant demand, thousands being required every year in the great clothing, boot and shoe, hat and harness making industries and factories of the country.

The sewing machine improvements of Division 24 include all machines which make a stitch in a fabric. This comprises specialized machines of many kinds, such as machines for sewing signatures in the art of book-making; for sewing brooms; for over-stitching the edges of fabrics, making buttonholes, etc.; for building up embroideries on fabrics after a predetermined pattern; for sewing up the seams in gloves, etc.; for stitching sweats into hats; for uniting the edges of knitted fabrics into an elastic seam, as where the ribbed ends of knitted drawers and sleeves are stitched to the main body of the garment; for sewing automatically placed buttons upon shoe flaps and other fabrics; for sewing shoe-uppers to soles; for sewing straw braid to make hats and bonnets; for sewing leather with waxed threads; for sewing carpets; for sewing straw into bottle covers and into thatch for roofing purposes; for making sacks and bags from textile fabrics; for sewing up the mouths of filled sacks and bags of grain, etc., etc.

In addition the Division includes the entire class of wearing apparel. Every garment which may be worn by man is the subject of his inventive faculty.

The armpit shield, first invented in 1876, is an instance of the value of this class of patents. This article is made at a low cost out of stockinet fabric covered with liquid rubber, cut and moulded into shape and sold in millions of dozens each year. Its royalty has made a princely income, because the demand for it is enormous, and increasing year by year. Another article similar in character is the corset or dress waist stiffener. Since the disappearance of whalebone from the markets of the world, the demand for a substitute stiffener has been constant and unsatisfied. In itself the article calls for apparent simplicity: in effect, however, it is difficult to supply a perfect substitute for the old whalebone of commerce. The demand, however, is so incessant, and continually increasing year by year, as the dress wearing population of the world multiplies, that a great fortune undoubtedly awaits the inventor who can supply the want cheaply and efficiently.



Mr. P. B. PIERCE,

And along with the apparel art go the apparatuses employed in its production. Charts and fitters for laying out garments: piling devices and apparatus for evenly and uniformly unrolling and spreading out webs or bolts of fabrics, until the plies are fifteen or twenty in number, one above the other, ready for the electric over-board cutter: great die machines for folding the edges of collar blanks, cuff blanks and shirt-bosom blanks and preparing them for the sewing operation: machines for plaiting fabrics into form for use in garment making; for shaping, stretching, turning and giving form to garments of multifold patterns: the hundreds of machines, also, which take the hat bat from the felting art, and shape, set, block, trim, wire, size, stretch, pounce, clean and iron the hat into finished shape as well as curl and flange the brim: all these, and many more machines and apparatuses go to make up the complement of the Sewing Machine Division, inasmuch as they generally call for the stitching function at some point or other of their operation.

In Division twenty-four are also classified all improvements in tents, canopies, umbrellas and canes. When one realizes how many umbrellas are

lost every year, and what a population of the size of that in the United States alone must demand, year by year, he is prepared to understand how various are the improvements patented in this art year in and year out. The inventive faculty of the universal man comes to the front in the garment art, as well as in the umbrella art. Every man comes into contact with his own clothes and his own umbrella. He meets a difficulty; a little inspection and consideration shows him how it may be remedied and improved. His application is promptly filed only to reveal the fact, in the first letter of rejection, that the same difficulty had been previously confronted by an earlier victim and remedied by substantially the same means. Not so, however, is an art like that of the sewing machine. Here the field of improvement belongs to the expert. He knows the difficulty because he is an expert; and, for the same reason, he generally knows what has been done to cure the defect. His application, therefore, is invariably apt to carry a substantive improvement.

The Division also has jurisdiction over all articles contained in Class 132, Toilet. Here are classified all devices for treating and holding the human hair, such as combs, crimpers, curlers, hair-pins, hat-pins and hair-structures: pins and safety-pins are also found in this class.

P. B. Pierce, Principal Examiner, was appointed to the Office as Third Assistant Examiner in 1875, from his native place, Canton, New York, although at the time a resident of Stockbridge, Massachusetts, where he was at the head of the Edwards Place School. In March, 1883, he was, as the result of examination, promoted from First Assistant Examiner to Principal Examiner and placed in charge of his present Division, which at that time and for the following fifteen years included the class of Designs. Mr. Pierce is a graduate A. B. and M. A. of Hobart College, and an L. L. B. of Columbia University, a member of the bar of the District of Columbia, an active member of the Anthropological Society of Washington, a member of the American Folk-Lore Society, of the American Historical Association, and a fellow of the American Association for the Advancement of Science.

Addis D. Merritt, Second Assistant Examiner, was born at Salem, Ill., educated in the public schools of that city, the Illinois College of Jacksonville, Ill., and Georgetown Law School, in Washington, D. C. He is a member of the Bar of the District of Columbia.

Federick A. Tennant, Second Assistant Examiner, who has charge of part of the class of Sewing Machines, was appointed from the Thirty-fourth District of New York, August 18, 1895. He received the degree of Electrical Engineer at Cornell University, N. Y., and the degree L. L. M., at the National University, District of Columbia. He served on the Jury of Awards in the Class of Machinery at the Pan American Exposition, in 1901.

Eugene G. Mason, Third Assistant Examiner, was born in Fredonia, N. Y.; received the degree of Electrical Engineer at Cornell University in 1894. He entered the Patent Office August 10, 1894, and is now in charge of part of the class of Sewing Machines.

Julian S. Wooster, Third Assistant Examiner, was born in Washington in 1877, was educated in Bridgeport, Conn., and also attended the Worcester Polytechnic Institute 1896—1898. He graduated from Columbian University Law School in 1901 with the degree of Bachelor of Laws, and received the degree of Master of Patent Law from the same University in 1902. His legal residence is in Connecticut, and he is a member of the Bar of that State. The classes examined by him include Sewing Machines, Apparel Apparatus, Tents and Toilet Articles.

NEED OF A NEW PATENT OFFICE AND HALL OF INVENTIONS.

By SENATOR DANIEL, of Virginia.

THE PATENT OFFICE is congested, overcrowded, and utterly insufficient for the display of inventions, and yet the American people are the most inventive people that ever lived in all the tide of time, and are overshadowing the world with the exploits of their genius.

The Commissioner of Patents has time and time again appealed to Congress for relief, but so far the appeal has fallen on dull ears. The necessities of government ought to come before its luxuries, and yet we have gorgeous plans for the beautification of Washington, while the bureau of government lies neglected and passed by.

The Patent Office pays for itself, and from every standpoint of view deserves the consideration that is asked. The bill which I favor, and of which I am the author, proposes to put on Capitol Hill, opposite the Senate side of the Capitol, a commodious and beautiful building corresponding to the Library of Congress building, which faces the House of Representatives side—a patent office and hall of inventions.

In this building should be displayed in models all American inventions, and such selected inventions of other nations as would be most instructive and interesting, especially those which have been patented in this country.

These inventions should be arranged so as to show the evolution, as for instance, from the old fashioned wooden plow to the steam plow, and from the scythe to the modern steam mow and reaper.

It would be a university of invention, where any inventive mind that had a crude conception would be stimulated by its contemplation, and led by stages of reflection toward the maturity of its designing power.

It would be in conformity with the eternal fitness of things to construct this building as a companion piece to the Library of Congress. In time the companion-piece of the Library of Congress must be constructed. Why not now? What better companion-piece could there be than the Patent Office and Hall of Inventions?

Scientific bodies of the country have indicated great interest in the establishment of a Patent Office and Hall of Inventions. The inventors are delighted with it, and it seems to me to be a just, wise, and expedient project.

I introduced the bill in December, 1899. It was never reported by the Committee on Public Buildings and Grounds. I was absent from this session of Congress for several months, and have therefore been prevented from bringing the measure to attention at an earlier time. I shall now renew the bill and urge its passage.

It appropriates \$600,000 for the acquisition of the site for the building, the building itself to cost some \$5,000,000—the cost of one of our modern battleships.

What an armory of peace and what a stimulus for progress it would be. It is invention that is bringing the nations in communion through the arts of commerce, and is making war repugnant by its tremendous perils.

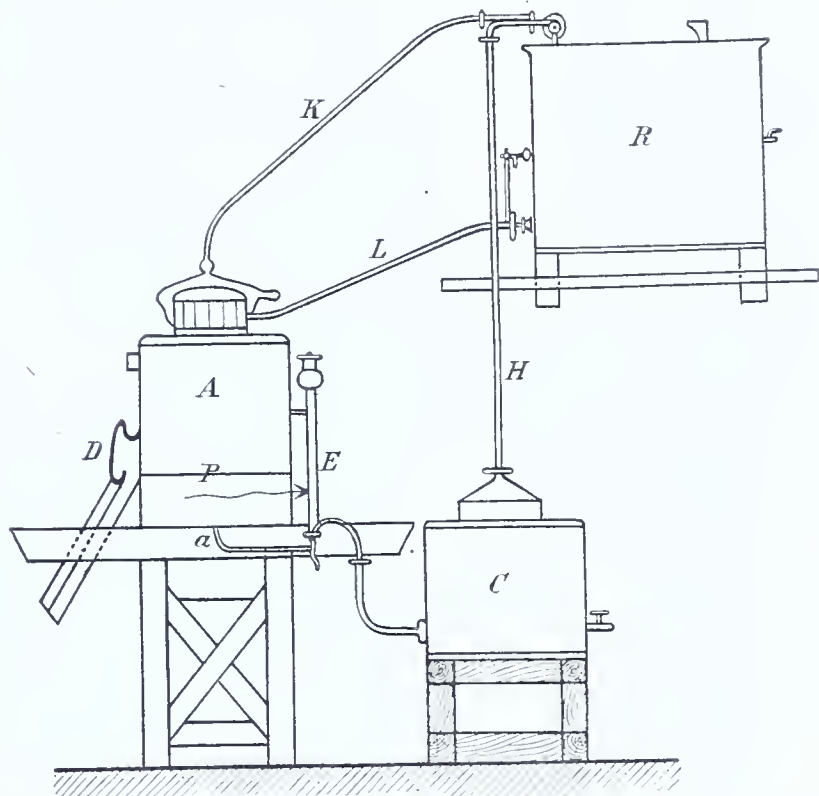
Every new invention is a contribution to the happiness and peace of mankind. The leading nation of the earth should boldly take the lead in the exaltation of inventive achievement: in the production of inventive power and in fostering care of the benefactors of mankind, who have put the world in debt for their good works.

EXTRACTION OF OIL BY CHEMICAL PROCESS.

It has been known for many years that various greases and oils become soluble upon being combined with sulphide of carbon, benzine, and gasoline. This knowledge has been used in a practical way for thirty years in the treatment of olive pulp and kernels, and for over ten years in the treatment of vegetable-oil cakes. The pioneers in this business were extremely successful, as they were able to procure practically unlimited quantities of olive pulp and stones, hitherto valueless, from which they extracted a merchantable oil. Their success was so great that nearly all oil crushers were led to undertake treating their seed cake in the same manner, and for ten years the business has been carried on with comparatively little change in the method employed. The mechanical

ure. The oil obtained by the naphtha process does not give out this odor, and it has a better color. The remaining pulp, or meal, after the extraction of the oil, is immediately dried, in order to prevent fermentation, and sold in sacks for fertilizing purposes. In England, the meal is sold for feeding purposes and is said to give satisfaction.

The accompanying illustration shows the mechanical arrangements necessary for the use of sulphide of carbon or gasoline. The raw material is emptied into the tank or basin *A*, and falls upon the false bottom *P*. An equal quantity of the solvent enters the tank through the tube *L* from the reservoir *R*. From *E* steam is conducted through coils under the false bottom *P*, and brings the mixture to a boiling point. The oil remaining in the cake is immediately relieved and rises to the surface with the boiling sulphide of carbon. The vapor arising from this hot mass is carried off through the tube *K*, to be eventually cooled down and returned to the reservoir *R*. When the boiling process has con-



appliances necessary are about the same, whatever solvent be employed.

In the new Verminck plant, the production of oil has been greatly simplified by doing away with the two and occasionally three separate pressings of the raw material, whereby several grades of oil were secured, in favor of one application of very high pressure, leaving a cake containing from 12 to 14 per cent of oil. While the one pressing makes it impossible to obtain a very high grade of comestible oil, this loss is made up for by the excellence of the product as a whole. The ordinary oil cake is then broken up into pieces about as large as hazelnuts and dumped into a vat in quantities of 66,138 pounds at a time. The plant is capable of treating 220,460 pounds of oil cake per day. Equal quantities of oil cake and of sulphide of carbon are required, in order that the remaining oil may be successfully extracted.

The oil produced by the chemical treatment is usually taken up by the soap trade, and its color and odor readily distinguish it from the oils obtained by the application of press-

tinued a sufficiently long time, the liquid is drawn through the tube *a* and kept hot by passing through steam coils and finally lodged in the second tank *C*, in which the temperature is brought to such a point that the dissolvent is converted into vapor, passing upward through the pipe *H*, to be condensed and discharged into the reservoir *R*, leaving the oil and a small portion of the dissolvent which fails to pass off as vapor in the bottom of the receptacle. At this point, live steam is introduced, which frees the oil completely from the small remaining quantity of sulphide of carbon, after which the oil itself is easily drawn off into a receiving tank. Live steam also frees the pulp in the tank *A* of the small amount of sulphide of carbon remaining, after which it is discharged at *D*.

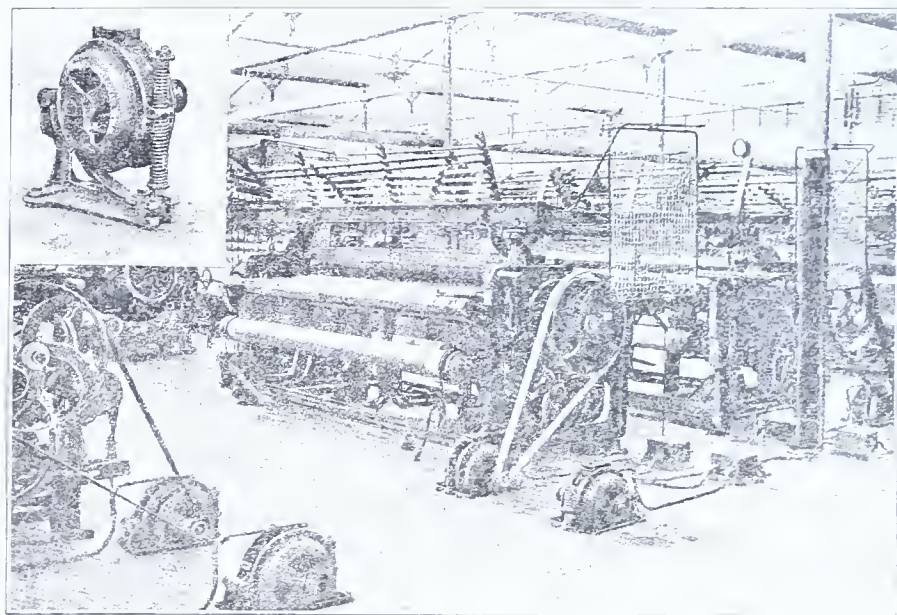
Thus it will be seen that the process is not a continuing one, but by the use of a series of tanks and the proper connections, the system can be made practically continuous, obtaining the maximum results with a minimum expenditure of chemical matter.

ELECTRIC MOTORS FOR SILK MILLS.

THOSE of us who have visited factories, have doubtless noticed the bewildering maze of belts, shafts and pulleys suspended from ceilings, and often wondered that the rapidly revolving belts, shafts and pulleys do not cause more trouble and involve more accidents than they do. Besides the original cost of installation, considerable attention in the matter of repairs, etc., has to be given to them. It has always seemed strange to us that some one did not devise a single motor for

ments have been made for some time past to utilize electric power for running looms. It is only recently that the Allgemeine-Elektrizitäts-Gesellschaft (General Electric Company) of Berlin has succeeded in solving the problem by the construction of a motor specially designed for running looms, and answering all the requirements.

In the accompanying illustration is shown the interior view of a silk mill, the looms of which are fitted with peculiarly constructed motors. The motors are clearly shown resting on the floor near each machine and connected by belts to the individual machines. At the upper left hand corner appears a representation of one of the motors. This illustration is taken



operating each individual machine. Of course, it would be too expensive to couple a separate steam engine to each machine. A motor for this purpose was required that should be light, portable, comparatively inexpensive and easily controlled. The invention of the dynamo provided means for effecting the desired result, though it has been a long time coming. Experi-

from a German trade journal.

The invention undoubtedly solves the problem of running looms and other machinery independent of each other. The motors could be applied to all classes of machinery without any change of the latter. It is clear that this arrangement not only saves power, but improves the conditions at present existing in all mills.

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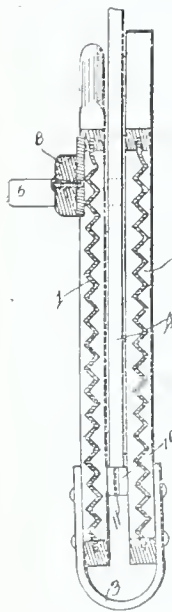
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WASHINGTON, D. C.

CLEVER NEW PATENTS.

Washing Machine.—Stop and Waste Cock.—
Thill Support.—Drill Rope Cutter.—
Grain Weigher.

Washing Machine.

A simple and efficient washing machine constructed along novel lines has been devised by an inventive genius, Mr. William B. Simpson, who resides in Gilliam, La. He uses two washboards 1, 2, which can be of substantially the ordinary construction, and which are spaced a slight distance apart, being connected

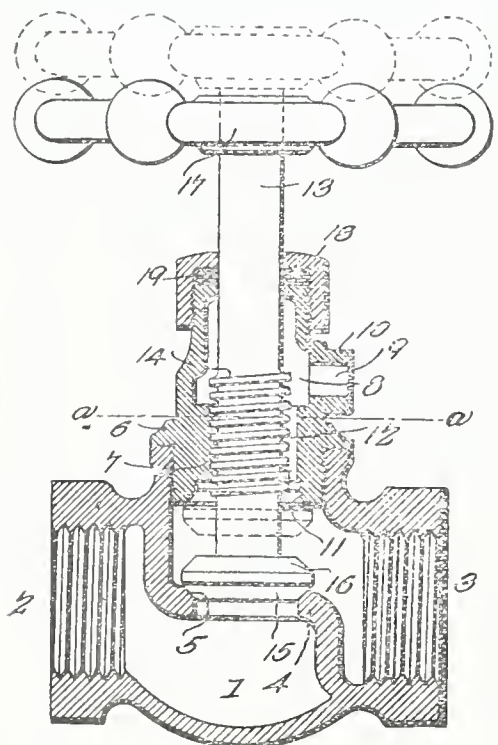


at their lower ends by U-shaped springs 3, the upper end of one board having guides that are slidably associated with the upper end of the other board. A weight is also fastened to the upper end of the upper board. Between these two washboards is slidably mounted a clothesholder 4, consisting of a bar having a handle at its upper end, and a cross arm on its lower end, which arm is provided with means for

securing the clothes thereto. In use, the machine is placed in a wash tub at an inclination exactly as with the ordinary wash-board, and the clothes are fastened to the intermediate holder. This holder is then reciprocated between the two boards, which are forced against the clothes by means of the springs and the weight. As a result, the dirt will be quickly eliminated, while the operator does not have to touch the clothing, the board, or the water during the operation.

Stop and Waste Cock

A simple valve arranged to be placed in a water service pipe, and designed to permit the draining of the pipe when the valve is closed and thus prevent freezing and bursting, has been patented by a well-known resident of Dallas, Texas, Mr. Ellis Munger, by

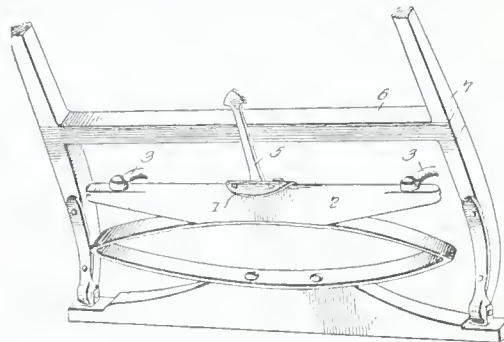


name. The body 1 of the valve, is of the usual form, the main pipe being connected at 2, and the water service pipe at 3. A web 4, extends across the body and has an opening therethrough,

around the upper portion of which is arranged a valve seat 5. A gland or cap 6, is screwed into the upper portion of the body and has a screw-threaded opening 7, through which the valve stem passes. This cap furthermore has a chamber 8, in its upper portion connected with the body of the valve by a passageway 12 and a discharge 8, leads from the chamber. The valve stem is shown at 13, having on its lower end a valve 16, that is movable so as to close the opening through the web 4, or it can be raised to close the passageway 12. It will thus be evident that when the valve is open, the water will flow directly through the body into the service pipe, but cannot pass into the upper chamber 8 of the cap, as the valve closes the passageway to the stem. When however, the valve is closed, this passageway is open, so that the water from the service pipe can pass through the passageway 12, into the chamber 8 and discharge at 9. As a result, the service pipe can be emptied in cold weather and the pipe thus protected against bursting.

Thill Support.

Mr. Washington I. Schryver, of Prophetstown, Ill., has devised a very simple and efficient device for supporting the thills or shafts of a vehicle when not in use. The support is attached to the front bolster of the vehicle, preferably on the inner side as shown. It comprises a base plate 1, rigidly secured to said bolster, and a supporting bar 5, pivoted to the plate and arranged to be swung up beneath

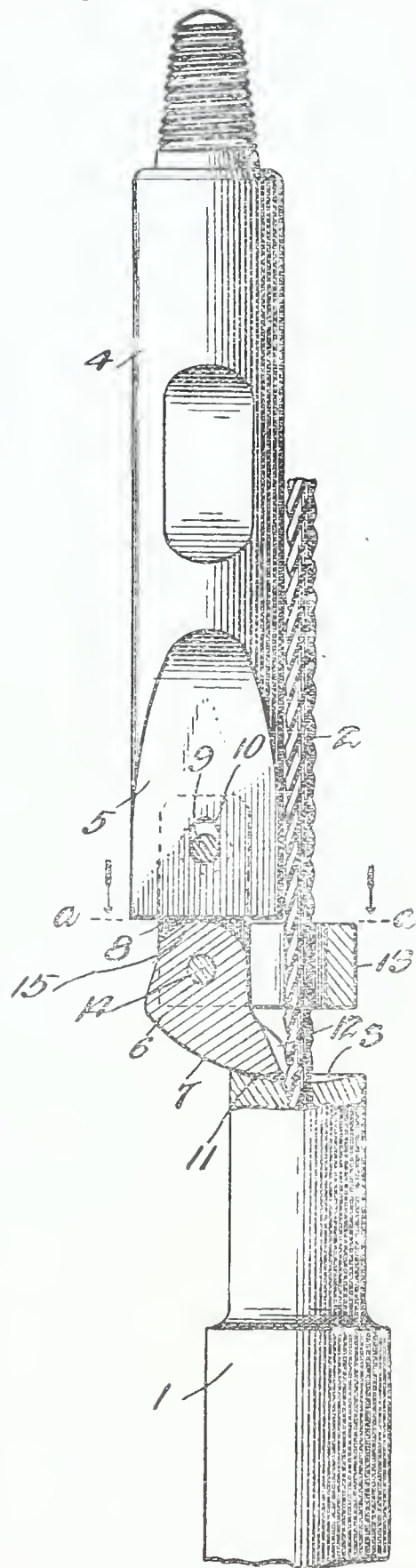


the cross bar 6, of the thills. When not in use, this support is arranged in a horizontal position, being secured in a suitable seat where it can not rattle or jolt. It will be evident that this device will fill a long felt want, as it does away with the necessity of sticks and supports ordinarily used, which strain and bend the different parts of the running gear.

Drill-Rope Cutter.

In drilling artesian or oil wells, it becomes necessary under certain conditions to cut the drill rope close to the drill, and heretofore it has been a difficult thing to do. Mr. George F. Bell, of Sistersville, W. Va., has, however, devised a tool which will quickly perform this operation. In the illustration herewith presented, the upper end of the tool or rope socket indicated at 1, is dished at 3, the rope of hemp or wire, being shown at 2. The cutting tool comprises a body 4, to the lower end of which is pivoted a knife 6, having a convex lower edge 7, that fits in the concavity 3. The front edge of this knife is sharpened and has a groove 12, which receives the rope. A guide loop or keeper 13, is attached to the lower edge of the body

and embraces the rope. In use, the tool is lowered into the well until the knife comes into contact with the upper end of the drill or rope socket. This impact will cause the knife to



move forwardly into engagement with the rope, thereby severing the same. The device is applicable not only for cutting hempen and like ropes, but is equally useful in severing wire cables.

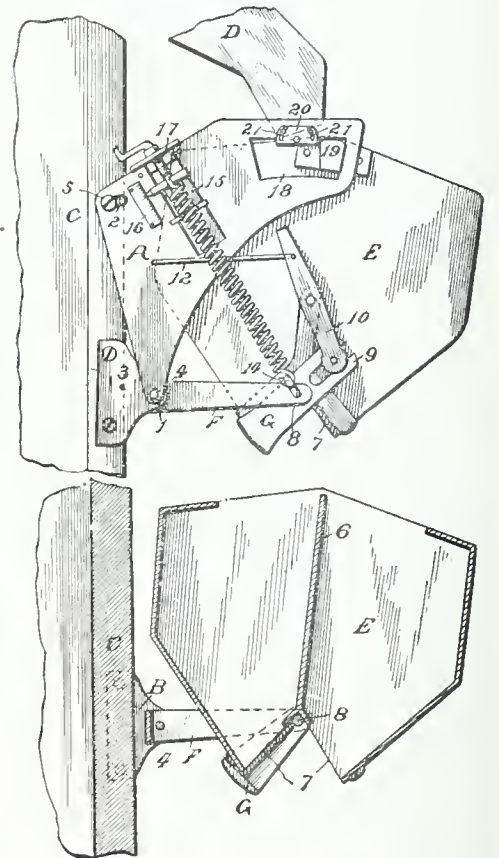
Grain Weigher.

Mr. Daniel Wilde, a well-known citizen of Washington, Iowa, several years ago invented an ingenious and highly successful grain-weighing machine designed to be attached to a threshing machine, and arranged to automatically weigh the grain as it came from the same. He has just patented an extremely important improvement in this line, which perfects the original invention. One of the objections to the original device was that if the threshing machine did not stand exactly plumb, the machine would weigh either light or heavy, and there was no means for properly adjusting it, as it was securely fastened to the threshing machine in the

factory. The new device overcomes this objectionable feature, and also embodies other improvements.

The accompanying illustrations show an exterior view of the machine, and also a vertical sectional view through the hopper. The side of the threshing machine is indicated at C, and to it are attached ears B, to which are pivoted brackets A. These brackets have in their upper corners, slots designated 2, through which are passed fastening screws 5. A bail or stirrup F, is also pivotally connected to the ears B, and carries at its outer end, a pivot rod 8, upon which the hopper body E, is supported, the body being divided by a partition 6, into separate hoppers, having lower discharge openings closed by a swinging gate G, also hung upon the rod 8. The movement of this gate is controlled by levers 10, that are connected with the brackets A, by means of rods 12. The bail or stirrup F, is supported by coiled springs, adjustably attached to the brackets as shown. These brackets, furthermore, have in their upper ends, openings 18, in which are movably mounted lugs 19 secured to the upper end of the hopper body, stop plates 20, being adjustably fastened to the brackets and projecting into the openings 18.

It will thus be seen that almost the entire mechanism is supported upon the brackets A, and as these brackets are adjustable, it makes no difference at what inclination the threshing machine may be placed, the weighing machine can be adjusted so that it will be supported exactly vertical. The operation of the device will be apparent.



When the grain is delivered through the spout D, it will pass into one of the compartments or hoppers that is closed by the gate, and when the desired weight has been reached, the hopper body will lower against the resistance of the springs until the lugs 19, disengage from the stop plates 20, whereupon the body will swing to bring the empty hopper or compartment beneath the spout. During this movement, however, the lower gate G, will also swing to close the open bottom of the empty hopper, thereby opening the full hopper and allowing the material therein to discharge. The weigher in this manner automatically operates back and forth, and is of the greatest accuracy, as the several parts are so constructed that each can be adjusted to properly perform its function.

A HIGH CLASS MUSICAL INSTRUMENT.

Not a Toy.

THIS novel invention in musical instruments embodies three distinct features, first, a harp; second, a harmonica; and third, a megaphono-resonator.

In the harp, a radical departure has been taken from the ordinary zither in the size and shape of the instrument body, as well as in the location of the strings. The scale of 15 strings, or two octaves, has been arranged on the right hand side of the harp on which the air or melody may be played, while the four chords or accompaniment have been placed in convenient groups on the opposite or left hand side. As shown in the illustration, the megaphono-harp is conveniently taken in the hands, while the thumbs are free to play the scale and chords. This novel arrangement enables the performer to play in almost any comfortable or convenient position, *i. e.* sitting, standing, walking, etc., etc.



The harmonica or mouth-harp holds the same relation to the megaphono-harp that the reeds sustain to a band, and can be introduced at any time at the pleasure of the performer, to give variety and expression to certain tunes. As shown, the harmonica is mounted on a standard. At the outer end of this standard is a hollow sound chamber in which the harmonica is removably secured, the standard and sound chamber being adjustable in varying directions to suit the ease and comfort of the player. This arrangement changes the ordinary "reedy" quality of tone to a pleasing mellow effect, in harmony with the beautiful quality of the harp chords, the whole reminding the hearer of a church organ or band. The harmonica also serves in an important capacity, as a tuning key for the strings, so that any one can keep the instrument in tune, without the aid of a piano or organ.

The megaphono-resonator is an entirely new and very important development in stringed instruments, and its value cannot be overestimated. Nothing like it has ever been

attempted before. The instruments that have been before the public have depended upon the size of the instrument body for tone and effect, which from the nature of the case was necessarily limited. The resonator is removably attached to the harp, and receiving the vibrations of the strings, the immediate effect of which is to enlarge the ordinary tones many times, so that the hearer unconsciously exclaims: "Sounds like a piano." "A large Italian harp," "Never heard such a beautiful tone before," etc. The resonator not only immensely increases the volume of tone, but gives a peculiar mellow and penetrating quality that appeals to all who hear it, and the effect is intensely beautiful when the strings are struck in the softest possible manner.

The following are some of the combinations that this wonderful instrument presents to the player:

1. Melody upon the scale and chord accompaniment; 2. Melody upon the harmonica and chord accompaniment. 3. Melody upon the scale and harmonica accompaniment. 4. Melody upon the scale and harmonica and chord

- accompaniment. 5. Melody upon the scale with tenor or second on the harmonica and chord accompaniment. 6. Melody upon the harmonica with tenor or second on scale with chord accompaniment.

The inventor of this instrument is Mr. William W. McCallip, of Columbus, Ohio. Mr. McCallip is a musical genius, being the author of several musical compositions. He has sold over fifteen thousand copies of his song entitled "Tell Mother I'll Be There," which he claims has done more for the good name and high character of the late President McKinley than all the "hordes of pestering politicians." The inspiration for this song was President McKinley's message to his dying mother on December 2, 1897. He has already taken out fifteen patents on various inventions, and holds a place among the inventors of the world, by reason of his patented machine for rolling hot wire rods, now universally in use in all the great wire rolling mills under the control of the American Steel and Wire Company, one of the constituents

of the great United States Steel corporation, or billion dollar trust.

For this invention Mr. McCallip, like most inventors and public benefactors, realized only a few thousand dollars, while the saving to the great wire trust has been reported to have been in the neighborhood of \$2,000,000, and is still increasing at the rate of about a quarter of a million dollars a year. The patent on this machine having expired, the United States Steel Corporation will continue to reap millions from Mr. McCallip's invention, while the man whose brain and ingenuity made the invention possible, must be content with the consciousness of having contributed to the sum of human progress.

The latest patent issued to Mr. McCallip was on the 25th of March, 1902, for a machine for automatically weaving what is known as diamond-mesh wire cloth. This machine takes the plain wire from two coils, automatically straightens the wire, crimps it, shears the wire into proper length after it is crimped, inserts the wires into the weaving machine, weaves the wire in the web, and rolls the cloth up on a drum or reel without a hand touching it after it is started. The great importance of this invention is apparent, when it is known that all diamond-mesh wire cloth is woven by the slow and tedious hand method.

CAPITAL PRIZE \$100,000.

Conditions for Great Airship Race at St. Louis.

General conditions to be observed in the airship race for the capital prize of \$100,000 offered by the World's Fair management have been agreed upon by the committee of aerostatic experts. The entire field, including time of the runs, shape of the course, qualifications of contestants, conditions of entry, facilities for construction, repair and experiments, allowance for size of machine and weight of engines, bearing of weather conditions, was gone over, and tentative rules decided upon. These rules will have to be submitted to the subcommittee of the executive committee and to the executive committee itself before they can be made public in their entirety. It has been decided that the subcommittee shall submit drafts of the rules to engineers, students, aeronauts and aeronautical societies in America and Europe, and obtain their views on the subject, changing the rules if that course seem best.

It was decided definitely that the \$200,000 appropriated for the contest by the board of directors of the exposition shall be divided as follows: \$100,000 for a grand capital prize, \$50,000 to be divided into a number of subsidiary prizes, \$50,000 devoted to the conduct of the competition and the payment of its expenses.

According to the newspapers, a Hamburg chemist has discovered a fluid which, when added to ordinary water, produces a liquid that can not be distinguished from petroleum. It can be used for lighting as well as for heating purposes. When burned in a lamp with an ordinary wick, it gives an extraordinary white light of double the strength of a petroleum flame. The fluid is not explosive. A company, it is said, has been formed in London for the exploitation of this discovery.

IMPORTANT DECISIONS IN PATENT CAUSES.

Supreme Court of the United States.

THE UNITED STATES REPAIR AND GUARANTY COMPANY *v.* THE ASSYRIAN ASPHALT COMPANY.

Decided January 6, 1902.

1. PATENTS—PROCESS OF REPAIRING ASPHALT PAVEMENTS—ANTICIPATION.

Claim of Patent No. 501,537, granted to Amos Perkins on July 18, 1893, for a method of repairing asphalt pavements, *Held* invalid because of anticipation by a French patent to Paul Crochet and certain publications.

2. SAME—SAME—NOVELTY IN THE MEANS.

A process of repairing asphalt pavements, the essential feature of which consists in applying heat to the edges of the excavation, so as to soften the material and make a bond with the new material, *Held* unpatentable in view of publications describing this process, although the patentee uses a new means for heating and applies it to a different kind of asphalt.

3. CONSTRUCTION OF CLAIMS—CANCELLATION OF CLAIMS IN PATENT OFFICE.

Where an application for a patent contains one process claim including the use of "heat" as one step, and a second claim including "a blast of heat," and the applicant cancels and abandons the second claim upon the objection that the claims were substantially the same, *Held* that the patentee cannot insist that the first claim covering the use of heat broadly is limited to a blast of heat.

4. SAME—COURTS CANNOT ENLARGE OR RESTRICT CLAIMS—MISTAKE IN DRAWING CLAIMS.

It is not within the rightful power of the courts to enlarge or restrict the scope of patents which, by mistake, were issued in terms too narrow or too broad to cover the invention, however manifest the fact and extent of the mistake may be shown to have been.

COMMISSIONER'S DECISION.

EX PARTE KINTNER.

Decided December 23, 1901.

1. DIVISION—BLOCK SYSTEM FOR RAILWAYS—AUXILIARY COMBINATION FOR SIDING AND DRAWBRIDGE—DEPENDENT INVENTIONS.

Where an applicant claims the combination of certain signals, switching devices, and safety-circuits with a current-feeder and sectional rails to prevent collisions upon the main line, and also combinations to be used in connection with it to prevent collisions upon a siding and drawbridge casualties, *Held* that the combinations mutually contribute to produce a single result and that division should not be required.

2. SAME—SAME—ELECTRICALLY-OPERATED GATE—INDEPENDENT INVENTION.

Held that an electrically-operated railway-gate for a grade crossing is an independent invention from a general block system the object of which is to prevent collisions, and that since the devices have acquired a distinct status in art and manufacture division was properly required.

3. SAME—SAME—SEMAPHORE—INDEPENDENT MANUFACTURE.

Semaphores have acquired a distinct place in the arts and manufactures and have been made an independent subject of invention, and therefore a semaphore should not be claimed in the same application with a railway block system, although it is specially designed for use in that system.

MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Siggers, Patent Lawyer, Washington, D. C.

David Somers, Oral Somers and Curtis Powers, Ossian, Indiana. Corn Planter.—The planter covered by the patent is of the wireless type, the ground being properly checked by blocks mounted upon the planter wheels. The dropping mechanism for depositing the corn in the hills is controlled by a dropper cam, carried by the axle of the planter, and co-operating with a swinging tappet operatively connected with the dropper shaft. As the planter is drawn over the ground, the tappet is intermittently actuated, and the corn is dropped at the desired intervals. The throwing of the dropping mechanism into and out of operation is provided for, by depositing the tappet within an open bearing block, secured to the planter frame, and having a gate closing the bearing and serving to confine the tappet within the block, so as to insure the proper operation of the dropping mechanism, and also arranged to support the tappet out of contact with the cam to prevent the dropping of the corn during the transportation of the implement from one point of use to another. The device also involves an ingenious arrangement for adjusting the check wheel upon reaching the end of each row, so that the checks of the several rows will be compelled to properly align.

Morgan A. Perrigo, Wilkesbarre, Pa. Process for Producing Axle Boxes.—The patent recently issued to Mr. Perrigo for his novel process for producing axle boxes marks a radical advance in the production of inexpensive, hard faced axle boxes. Mr. Perrigo experimented for some time with a view to producing a cast axle box having an interior bearing face, which will be exceedingly hard and susceptible of the smooth finish necessary to the anti-frictional rotation of the box upon the axle. The efforts of Mr. Perrigo were finally crowned with success, as he discovered a process whereby the interior bearing face of a cast iron axle box may be made as hard as chilled steel, during the casting of the box around a core in the usual manner. As described in the patent, the process consists in forming the mold core from a mass composed of pulverized sulphur, sand and molasses water, and in thereafter casting the axle box around the core. While the process is simple, it has resulted in a material advance in the art, and is of unusual interest to founders and vehicle axle box manufacturers.

Leopold C. Levy, Blenod-les-Pont-a-Mousson, M. & M. France. Educational Appliance. The appliance described in this patent is designed for the objective instruction of pupils in arithmetic. It comprises a base or board of convenient size for support upon the desk of the pupil, and equipped with rows of stationary objects arranged progressively across the board at the upper end thereof, the number of objects in each row being indicated above the rows in Roman notation, and below them in Arabic notation. This portion of the appliance constitutes an objective key designed to familiarize the pupil with the notations, and to impart constantly an objective impression of the number of objects represented by each character. Below this objective key, the board is provided with a checked surface, forming squares within which the pupil arranges a number of small disks in accordance with a prescribed method, and bearing such relation to the objec-

tive key that the latter will indicate the results of examples in addition, subtraction, multiplication and division arranged objectively by the use of the disks. Mr. Levy's invention has received high commendation from prominent educators in this country as well as in France.

James F. Watts, Wadsworth, Ohio. Corner Joint for Vehicle Bodies.—The object of this invention is to provide a joint which will make it possible for the employment of a corner post of hard wood, so constructed with reference to the bottom sills and panels of the vehicle body, as to permit the panels to be united thereto flush with the outer exposed surface of the corner post, the latter being provided with means adapting it to interfit and interlock with the bottom sills. The construction is simple and practicable, and avoids many objections to the ordinary corner joint for vehicle bodies.

Albert L. Butt, Russellville, Ky. Calculating Device. For years, persons have been looking for some simple device which will mechanically calculate sums of interest and obviate the necessity of mental arithmetic and involved mathematical problems. Mr. Butt has succeeded in doing this by means of the present device, which he has properly named the Twentieth Century Banker. The machine comprises a small casing having a sight opening. Within this casing is revolvably mounted a cylinder carrying a table of interest calculations, the sight opening having a coacting scale along two of its edges indicating the per cent and the amount upon which interest is to be calculated. The cylinder is actuated by an exposed knob and is held against accidental movement by a suitable dog. Slidably mounted across the sight opening is a finder plate which shows only the per cent interest desired to be found.

Rev. John W. Frizzell, Eau Claire, Wis. Typewriter Support for Desks.—One of the most useful devices recently patented is this typewriter support, which is so constructed that it can be attached to any ordinary desk or table and will hold a typewriter in the most convenient position for use, or completely out of the way and housed from all dust. A horizontally disposed frame is employed, which is slidably supported beneath the top of the table or desk by means of rollers. Upon this frame is pivotally mounted a platform having means for slidably securing a typewriter thereon. A spring drum is attached to the frame and has a connection with the platform, and a chain limits the downward movement of the same. In use, the frame and the platform, which is in tilted position when not in use, is drawn outwardly from beneath the desk or table and the platform is then swung to a horizontal position, the typewriter being moved to the outer end of the same and thus securing it in such position. When not in use, the typewriter is arranged at the inner end of the platform, and said platform is tilted, the entire structure is then pushed beneath the desk or table so that it is out of the way and is completely housed within a casing formed for the purpose.

James L. Kerstetter, Inventor.—F. W. Wagner and F. W. Winger, Assignees, Bradford, Pa. Ink Well and Stand. This is an ingenious device in which the cover for the well will be automatically closed when the pen is laid upon the rack, thus preventing the evaporation of the ink, means being also provided to prevent the pen being dipped too deeply. In the structure illustrated by the inventor, a frame is employed within which is placed the well or bottle. A cover for the dip opening is pivoted to the frame and is weighted so that it is normally in open

position, this cover being so arranged, however, that when the pen is placed on the rack, said pen will come into contact with it and close the same over the opening. A casing is arranged in the dip opening, and tapers towards its lower end which is open, this casing being so arranged that it will prevent the pen being dipped too deeply in the ink.

Crawford D. Logan, Inventor.—Thomas J. Gipson and Albert V. Cheney, Assignees: Coal Hill, Arkansas. Trunk Lock.—In the INVENTIVE AGE for July, 1900, a trunk lock patented by Mr. Logan, was fully described, and now he has obtained a patent on important improvements therein. The locks invented are designed to do away with the necessity of keys, and at the same time they are more thoroughly protected than those now ordinarily employed. The inventor employs a casing pivoted to the lid of the trunk and arranged to fit in a socket formed in the adjacent portion of the trunk body. Within this casing is located permutation locking mechanism of a novel form, which is adapted to engage and hold a sliding bolt in operative position. This bolt is moved by hand, being provided with a projecting thumb piece. A cap plate pivoted to the hasp fits over the locking mechanism, and is held in place by this same thumb piece employed in moving the sliding bolt. The structure is much simpler than that formerly patented and has decided advantages thereover.

Charles R. Alsop, Middletown, Conn. Reversing Clutch.—One object of the invention is to provide a clutch which will enable the driven part to have a rate of speed greater or less than that of the driving part. The invention comprises a female member fixed to one shaft, a male member, either fixed or movable, on a separate shaft, but shiftable to coact with one part of the female member to cause direct motion, friction rollers to coact with another part of the female member, and with a part of the male member, to cause reverse motion, and means for holding and guiding the rollers with relation to the parts with which they coact, the coacting surfaces of the different parts of the clutch being all pitched at an angle to the longitudinal axis of rotation and on lines that converge to a common center. The invention embodies other novel features, and the patent contains a number of very important claims. In the "Patents For Sale" column of the INVENTIVE AGE appears an illustration of the clutch.

Walter B. Nichols, Edward A. Nichols, and Frank N. Schad, Gainesville, Texas. End Gate Fastener.—This device serves to firmly hold the gate in place, and at the same time clamps the side boards of the wagon against the end gate. In carrying out the invention, the side boards are provided with downwardly curved, open-ended slots, and the end gate carries arms for engaging the slots. A locking lever is mounted on a pivoted cleat attached to the end gate, said lever being connected with the said arms, one of which is adjustable lengthwise. Another feature of the invention resides in providing the wagon body at each side with a single long cleat, and short cleats spaced from the long cleats and cooperating therewith, said short cleats being provided with an outwardly curved upper extremity. The fastener possesses a number of advantages over other devices, and has been received with much favor wherever introduced.

William W. Bartlett, Inventor.—Frank Lamphier, Assignee, Wheeler, Mich. Beet Blocker.—This device is constructed to cut out blocks or sections of plants in a row of beets, so as

to leave stools of standing plants which are separated by spaces. The cutting or chopping apparatus consists of a rotatable frame having longitudinal knife blades which are beveled at their front ends to prevent tearing of the plants. One end of the rotatable frame is mounted in a shiftable cross-bar which is normally locked to hold the cutting frame in operative relation with the supporting wheels of the machine, there being a trip device to lock the cross-bar, and a spring to automatically shift the same and throw the machine out of gear.

John D. Canale, Memphis, Tenn. Game Board.—This is a very unique and exceedingly interesting device, embodying a dished body having a transparent cover spaced from the bottom thereof, the latter having its upper side provided with a concentric series of circular depressions which are differently colored and provided with numerical scales. Between the bottom of the body and the transparent cover are freely movable pointers, which are colored to correspond with the respective depressions and are provided with intermediate lateral projections to be engaged with seats at the centers of the depressions. It is intended to tilt and shake the device to bring the pointers into the respective depressions and into cooperation with the scales thereof, the player making the highest sum total being the winner of the game.

Conrad P. Steinmetz, Inventor. Albert Boynton, Assignee, Mitchell, South Dakota. Washing Machine.—This machine has a metallic tub provided near its upper edge with an inwardly-directed annular bead, upon which rests a wooden top having a central opening which is closed by a hinged cover. The rubber shaft projects upwardly through the cover and is driven by the operating mechanism which is mounted upon the cover. An important feature of the machine resides in the provision of an upstanding wringer support interposed between the wooden top and the side of the tub with its upper edge projected above the top of the tub, there being a hoop embracing the top above the bead, and fastenings passed through the hoop, the tub, the wringer-support and into the wooden top.

Amos E. Pollard, Montezuma, Iowa, Inventor: Lorain C. Medearis, Assignee, Marshalltown, Iowa. Check-Rein Guide.—This device consists of a crown piece, to the upper side of which a strap is applied with its opposite ends only connected thereto, there being a metal plate fitted between the crown piece and the strap, with opposite projections struck therefrom and entering openings in the strap, the opposite check-rein sections being loosely received between the projections and the respective ends of the strap, whereby the check-rein sections are maintained separated. There is also a metal loop projecting through a central opening in the strap, and held to the crown piece by a leather loop, which carries a buckle to receive the upper end of a winker stay, the metal loop being designed to receive the free end of the stay.

Caspar Hummel, Joliet, Ill. Hoop-Tightening Device.—This device is intended for tightening barrel hoops when the barrels are piled sidewise one upon the other, and consists of a bracket to be applied to the chine of a barrel, and carrying a screw having a hand wheel at its outer end and a swiveled hook at its inner end, there also being a pair of hooks for engagement with one of the hoops, and chains leading from the hooks to the swiveled hook on the screw, so that by manipulating the latter the hoop may be drawn tightly upon the barrel.



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FOR SALE.—Patent No. 641,163 dated January 23, 1902. Detachable cash desk. For particulars address Vincent A. Fabrick, Box 122, LaSalle, Illinois.

FOR SALE OR LEASE ON ROYALTY.—U. S. Patent No. 695,183 dated January 23, 1902. Also Canadian patent 75,013 dated March 11, 1902. Traveler's lock. Can be manufactured at small expense and sold readily. Address Henry Spear, 119 East Canal St., Richmond, Va.

FOR SALE.—Patent No. 695,511 dated March 13, 1902. Butter cutting machine. Will sell entire right lease in royalty. Best machine out for cutting two butter. Address L. Smith, P. O. Box 121, Goodground, Long Island, New York.

FOR SALE.—Patent No. 691,289 dated January 14, 1902. Thread and Cord Cutter. Constructed from a single piece of sheet metal. This patent is worth investigating. Address Mrs. C. P. McKim, Box 116, Newton, N. J.

FOR SALE.—Patent No. 694,442 dated December 24, 1901. Cotton Chopper Attachment for Cultivators. Can be applied to any cultivator now in use. Easily attached. No extra expense in operation. Address John J. Vickers, Pittsburg, Texas.

FOR SALE OR LEASE ON ROYALTY.—Patent No. 693,249 dated February 25, 1902. Also Canadian patent No. 75,474 dated April 15, 1902 for twine loom. Prefer to sell Canadian patent outright. Address G. E. Ernst, Box 140, Normal, Illinois.

FOR SALE.—Patent No. 695,555 dated March 13, 1902. Lock-stitch sewing awl. A unique and useful tool. Will sell a great want on the farm and in any household for repairing harness and shoes. Territory for sale. Agents wanted. Address Padon and Van Wormer, West Plains, Missouri.

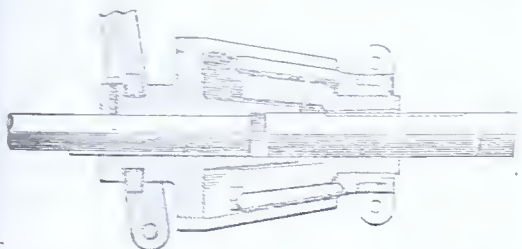
FOR SALE.—Design patent No. 35,774, issued February 4, 1902. Dressing case. Will sell outright or to manufacturer on royalty. Case hangs on wall, and is suitable for public and private buildings. Address Lee O. Church, Verne, Knox County, Indiana.

FOR SALE.—Patent No. 695,346 dated April 22, 1902. Hose reel. Effects winding of two lengths of hose with each rotation of reel. For particulars address Albert E. Wood, 5 Akron Street, Meriden, Connecticut.

FOR SALE.—Patent No. 692,333 dated February 4, 1902. Bicycle. Complies with Union handle bars in a convenient and well manner. Something entirely new. For particulars address Tazian Bros., Paterson, N. J.

FOR SALE.—Patent No. 696,012 dated April 1, 1902. Improvement in word marks. Will sell entire right for \$1,000. Embodies improved sail adhesive mechanism. Address William Baker, Loyal, Wisconsin.

FOR SALE.—Patent No. 691,754 for reversing clutch. Issued February 4, 1902. Specially adapted for use in boats, motor engines, Simple, strong and efficient. Address Charles R. Alsop, Middletown, Connecticut.



FOR SALE.—Patent No. 691,700 issued January 11, 1902. The only successful wall paper pasting machine invented. It will pay you to investigate. Address with stamp A. W. Foster, Milbridge, Maine.

FOR SALE.—Patent No. 690,126 dated March 5, 1902. Portable Feed Trough. Avoids waste of feed. The invention of a practical farmer. Territorial rights for sale. Address Samuel Stoner, Brock, Ohio.

FOR SALE.—U. S. Patent No. 695,715, dated March 13, 1902. Sewing instrument. A 1000 every machine should have. Used for different purposes. Will sell entire patent. For descriptive circulars address Morris Chamberlain, Bartley, N. J.

FOR SALE.—U. S. Patent No. 665,419 dated January 8, 1901. Pool game register. For registering number of games played. Will sell entire right or lease in royalty. Address William Graham, Portal, N. Dakota.

FOR SALE.—Lease in Patent No. 694,411 dated December 10, 1901. Desander for ferrous. Address J. K. W. Carson, Winchester, Kansas.

FOR SALE.—U. S. Patent No. 695,465 dated March 13, 1902. Also Canadian patent 75,411 dated October 15, 1901. A double-headed cutting machine. Bar is designed to cut in two opposite directions. Suitable for cutting many manufacturers and agricultural implements. Address J. S. Ryan, Pleasant Hill, California.

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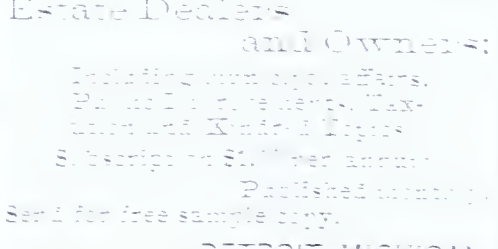
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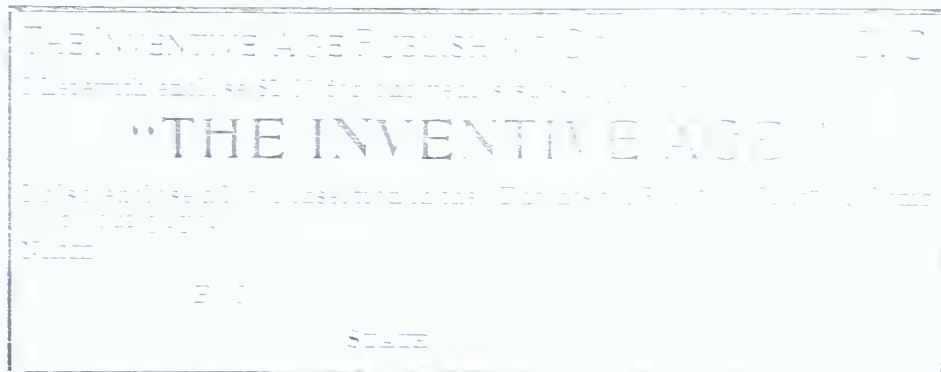
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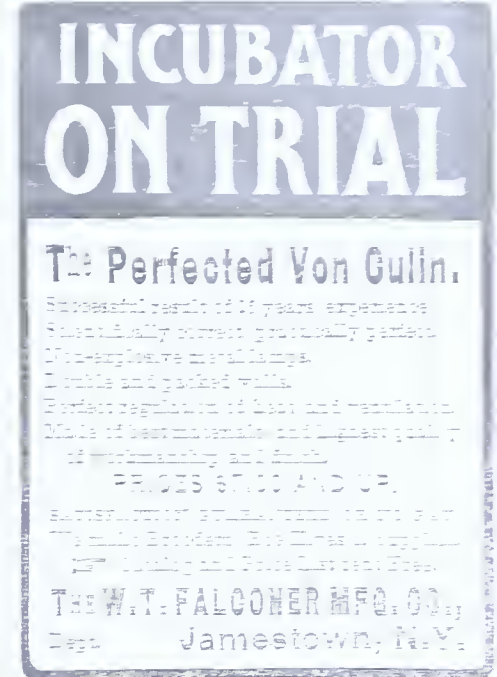
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The Inventive Age

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Proposed Trade-Mark Legislation.

Senator Pritchard, Chairman of the Committee on Patents, has reintroduced the bill prepared by the commission appointed by President McKinley to revise the patent and trade-mark laws of the United States. The commission was composed of Judge Grosscup, Francis Forbes, Esq., and the Hon. A. P. Greeley, late Assistant Commissioner of Patents. The commission submitted two bills, one supported by Judge Grosscup and Mr. Forbes, and the other by Mr. Greeley. These bills were discussed in the April 1901 issue of the AGE, and need not be considered at the present time further than to say that the bills cover the whole field of marks used in commerce between the states as well as in foreign commerce. The cost of registration is reduced to ten dollars. The trademark laws have always been exceedingly deficient, and the practice has not been consistent and uniform. We favor the minority bill and hope that it may receive legislative approval.

Suspicious Inventors.

As every one knows, inventors are suspicious: inordinately so. They frequently imagine that attorneys are going to steal their inventions. We have noted this suspicion a number of times in our experience, and have done our part in attempting to convince inventors that there is no ground for it.

We have followed very closely the practice of the Patent Office for a number of years, and we do not know of a single recorded instance where an invention was appropriated by an attorney. There have been hundreds of instances where the attorney has stolen the money of the inventor, but whether it was that the inventions were not considered worth stealing, or because the money was more needed and could be more readily appropriated, we cannot say. We know that in the cases where attorneys have been disbarred from practice before the Patent Office, there has never been one where

the disbarment was based on the attorney attempting to appropriate the invention.

Possibly also the inventor who makes an invention that is worth appropriating, usually has the good sense to employ an attorney whose character and past record are a guarantee of his honesty.

MULTIPLICITY OF CLAIMS.

A Queer Decision.

A decision of the Supreme Court of the United States, which has not attracted the attention commensurate with its importance, is the case of the United States Repair and Guaranty Company, v., The Assyrian Asphalt Company, the syllabus of which is printed in another part of this paper.

In this case a suit was brought for the infringement of three patents, one of which related to an improved method of repairing asphalt pavements. The claim of the patent is as follows:

"The method of repairing asphalt pavements, which consists in subjecting the spot to be repaired to heat, adding new material and smoothing and burnishing it, substantially as described."

While the application for this patent was pending, the applicant presented a claim like the quoted claim, with the exception that instead of using the word "heat," the claim read "a blast of heat." The Patent Office Examiner ruled that the two claims were the same in substance, and both could not be permitted to remain in the same case. The applicant cancelled the limited claim, which read "a blast of heat," and took out the patent on the above-quoted claim.

One would suppose that since the patent showed and described means for producing "a blast of heat," that a court, in order to sustain the patent, would read into the claim "a blast of heat," if it were found necessary to do so. There were certainly precedents for such a course. But the Supreme Court after due consideration held—

"Having voluntarily abandoned the claim for a method limited to the use of 'a blast of heat,' the patentee or his assignee may not now insist that a broad claim, containing no suggestion of such intention, shall nevertheless be subjected by construction to the same restriction. * * * It is not within the rightful power of the courts to enlarge or restrict the scope of patents, which by mistake were issued in terms too narrow or too broad to cover the invention, however manifest the fact and extent of the mistake may be shown to have been."

This a most extraordinary case, and emphasizes the importance of weighing very carefully the legal effect of any action taken in an application for patent. Some divisions of the Patent Office allow an applicant great laxity in the drawing of similar claims, where the novelty of the invention is clearly apparent. Others are very persistent in holding that "too many claims" are presented, or that certain

claims are duplicates of others. On the strength of this decision, it would appear to be the part of wisdom of every attorney, or applicant for patent, to consider very carefully any objections of this sort, and not accede where there is a manifest difference between the claims. In the case referred to, if the patent had contained the claim for "a blast of heat," it is probable that the charge of infringement might have been made out.

When it is remembered that the presence of duplicate claims in a patent can do no real harm, that no patent has been declared invalid solely because of a large number of claims, and that the filing of a disclaimer or reissue is always open to a patentee, it seems to us that the Patent Office should maintain a consistent and liberal policy of permitting an applicant to state his invention in as many ways as possible, for there is no damage done to the interests of the public in pursuing this course. If the invention is well covered by the claims of the patent, no one has a right to complain, whereas, if it is insufficiently protected, gross injustice will always be done.

The Canadian Patent Office.

The report of the Commissioner of Patents of Ottawa, Canada, is before us, and shows, as in previous years, that the larger proportion of applications for patents came from inventors residing in the United States. During the year 1901, 4,766 patents were granted, a larger total than in any previous year. Of this number, 3,423 (over 71 per cent) were issued to U. S. inventors. The total revenues for the year were \$120,064.37, being the largest in the history of the Patent Office; an increase of \$6,211.91 over the preceding year and a surplus of \$69,211.38 over the expenditures.

At present the Canadian Patent Office is engaged in classifying all patents issued by that Office. As the outcome of this policy, the Office will be able at an early date to publish a complete and general index of inventions covered by all patents granted up to the present year.

The Commissioner reminds applicants that great care "should be taken in the preparation of the papers which are required by the rules and forms, and unless competent to prepare them, they should employ a skilled attorney, as the value of patents is largely based upon the ability with which the specifications and claims have been prepared."

The Canadian Patent Office Record, which corresponds with the U. S. Patent Office Gazette, is published monthly. It contains a list of registered copyrights, trade marks and designs, as well as the claims and drawings of all patents granted in Canada.

The attention of patentees and their solicitors is again called to the necessity of remitting partial fees before the expiration of the six and twelve years' terms, otherwise the patents will cease, the Commissioner not being vested with the discretionary power, under any circumstances, to revive them. A revival can only be secured by a private Act of Parliament, the obtaining of which entails considerable expense to the patentee, and is usually very difficult to secure.

The New Design Patent Law.

In the April AGE reference was made to the conflict between the decisions of the Patent Office and the courts on the subject of design patents. After consideration of the matter, Commissioner Allen recommended a revision of section 4929 of the Revised Statutes, which relates to design patents, and Congress acted with promptness on the recommendation. The change in the law is a radical one, as will be seen by a comparison of the old section with the amended one. Section 4929, as it originally stood, was as follows:

"Any person who, by his own industry, genius, efforts, and expense, has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo, or bas-relief; any new and original design for the printing of woolen, silk, cotton, or other fabrics: any new and original impression, ornament, patent, (pattern) print, or picture to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture, or any new, useful, and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, may, upon payment of the fee prescribed, and other due proceedings had, the same as in case of inventions or discoveries, obtain a patent therefor."

As amended May 9, 1902, section 4929 reads thus:

"Any person who has invented any new, original, and ornamental design for an article of manufacture, not known or used by others in this country before his invention thereof, and not patented or described in any printed publication in this or any other foreign country before his invention thereof, or more than two years prior to his application, and not in public use or on sale in this country for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law and other due proceedings had, the same as in cases of inventions or discoveries covered by section forty-eight hundred and eighty-six, obtain a patent therefor."

One of the changes in the Statute is the omission of the word "useful," the Circuit Courts of Appeals for the Second and Sixth Circuits having held that design patents could only be issued to cover designs which were strictly "ornamental," and that new shapes or configurations of articles of manufacture, which were simply useful and not ornamental, could not be protected under the original design patent act. While we believe that the Circuit Courts of Appeals were in error in the conclusions reached by them, and that the Supreme Court of the United States had decided differently, it was evident to those inside the Patent Office that something had to be done, in order to remedy a situation which was rapidly becoming intolerable, and the Commissioner probably thought that the best thing to do was to amend the law so as to bring it in line with the decisions of the Courts.

The Statute has been improved by the amendment in the matter of conciseness and clearness, and has been patterned very closely after section 4886 of the Revised Statutes, under which mechanical patents are authorized to be issued. There has also

been introduced in the Statute, "the public use" clause: and it will be impossible hereafter for an inventor to secure a design patent on an invention illustrated in a mechanical patent issued two years before the application for design patent. Just how the Patent Office is going to treat those applications which were filed before the statute was amended does not at present appear, but it is manifest that the provisions of the law are not retroactive, and it is thought that the Office should consider, in a liberal spirit, those applications which were filed before the statute went into effect. It is perfectly clear that under the old statute, an applicant had a right to a design patent on any new, *useful*, and original shape or configuration of any article of manufacture. The decisions of the Circuit Courts of Appeals are in line with the amended statute, and in our judgment should not control the Patent Office in the determination of applications for patents filed before the statute was amended.

WORKING OF FOREIGN PATENTS.

How it Works.

An illustration of how the laws of Germany, France, Belgium, and other countries of Europe, which require the "working" of patents within a certain period, are used to "hold up" foreign patentees is revealed in a recent article which appeared in the *Trade Journals Review* of London. An influential delegation waited on Mr. Gerald Balfour, to insist upon the necessity of inserting a clause in the new Patent Bill compelling foreign inventors to give a *quid pro quo* for their monopoly, by compelling them to manufacture in that country (England.) Mr. Ivan Levisstein showed the hardship inflicted on the chemical industries by the absence of such a clause. With regard to the trade in machinery Mr. Joseph Lawrence referred to the case of the linotype machine, invented fifteen years ago—how he had tried to obtain a license to manufacture in England, and was refused on the ground that the American makers were prepared to fully supply the British market. In consequence of this refusal, he was obliged to buy for his company the British rights at a cost of £800,000, whilst, owing to the provision of the German law which requires patents to be worked within the empire, the Germans acquired the right to manufacture by paying a royalty of six per cent., on the selling value of the machine, and this royalty to cease as soon as it amounted in the aggregate to £185,000. In this way the Germans were able to buy the full rights for little more than one-fifth the amount required from the English company. Many other instances of a similar kind were brought before Mr. Balfour's notice by the deputation: but judging by his reply, it is doubtful if these representations will have the desired effect.

How Some Inventors Think They Save Money.

A case has come under our observation recently which demonstrates how inventors, with a mixed desire to save money and prevent their inventions being stolen, apply for patents direct to the Patent Office. There is an old legal maxim that "a man who acts as his own attorney has a fool for a client." It is absurd to expect an inventor, or any one else for that matter, without advice or previous experience, to prepare correctly the specification and claims of an application for patent by the aid of the Patent Office rules of practice in connection with a few copies of patents. While any one can probably prepare a description of the invention, there is something more than merely describing what a thing is, in properly presenting a specification in an application for patent. As is well known, the claims of a patent can never receive a broader interpretation than the specification and drawings justify. Merely drafting a limited specification of the invention, and then presenting broad claims, is not the proper practice. The specification should be made as broad in terms as the claims.

Returning to the case under consideration, the inventor had applied for a patent without the assistance of competent counsel. He lived at some distance from Washington, and finding himself unable to secure a patent by correspondence, he concluded to take a trip to the National Capital. Still without legal assistance, he saw the Examiner at the Patent Office, who very courteously but firmly explained to him the situation. Finding the Examiner obdurate in the matter of granting him a patent, it dawned on the inventor, for the first time, that he might be throwing away a valuable invention by not securing legal advice. The attorney approached unqualifiedly sustained the opinion of the Examiner, for the invention was fully anticipated. All the time and expense of the application for patent and the trip to Washington might have been saved, if the applicant had had an examination made to determine the patentability of the invention before applying for a patent.

This case is not an unusual one—on the contrary, we know of numerous cases in which substantially the same routine was proceeded with. Many inventors apply for patents on old inventions, when, if they had sent models or drawings of their inventions to competent attorneys, they would not only save themselves the government fees, but also a great deal of anxiety and trouble. The inventor in the case referred to spent in the neighborhood of \$50, counting the government charges and his trip to Washington, whereas if he had sent his invention to an attorney and remained at home, he would have received an adverse report as to patentability for a small fraction of what he eventually spent. We have no doubt that the inventor thought he was a pretty smart man in being able to apply for his own patent, and thus save the expense of the attorney's fee, but it is safe to say that the next time he applies, he will have the good sense to find out if the invention is patentable before making the application.

A New Patent Office Wanted.

The attention of our readers is earnestly called to the article by Senator Daniel, of Virginia, in support of his proposition for a new Patent Office and Hall of Inventions. This is a plan which must not be allowed to sleep. The Patent Office annually returns to the Treasury a considerable sum of money. We think the amount to the credit of the Patent Office in the U. S. Treasury would be more than sufficient to pay for this building. It would not only relieve the congested condition of the Patent Office, but it would be a credit to the United States. Those who have followed the publication in the AGE of the different divisions of the Patent Office, have been struck with the fact that in many instances eight or ten desks are crowded in one room. Invention has been one of the greatest factors in the elevation of the human race. As Senator Daniels says, "every new invention is a contribution to the peace and happiness of mankind." Other Senators should rally to the support of Virginia's favorite son. He should not have to fight this battle alone.

Commissioner Allen has been very successful in securing much needed legislation as well as appropriations from Congress, and we hope that he will be properly supported by inventors, manufacturers and their friends in urging on Congress this meritorious claim for recognition.

Novel Razor Sharpener.

Mr. Oscar Newhouse, of San Francisco, Cal., has discovered a method of keeping the edges of cutting instruments sharp without the necessity of any manual labor. The invention is especially useful in fine instruments having a keen edge, such as razors and the like, which edges, as is well known, have minute teeth or projections that cause the "drag" and "pulling" when shaving. The inventor claims that by placing the cutting edge of the blade in proximity to a magnet and retaining it there for a considerable period of time, these teeth or projections will be drawn out by magnetic force so that the edge will be comparatively even and much sharper. The razor is placed within its usual guard or casing, a bar magnet being arranged within one side of this casing and contiguous to the edge of the razor. After shaving, it is only necessary to place the razor away and the magnet will be operating upon the edge so that it will be resharpened by the time it is ready for use again. The inventor affirms that he has carefully tested the arrangement, and has found that the razor can be used a great many times without stropping or honing it.

Electric Fan Deflector.

Considerable activity is being shown in providing means for directing the current of air from an electric fan to different parts of the room, but it is believed that one of the most ingenious devices yet produced is that devised by Mr. Walter E. Coleman, of New

Dorp, N. Y. In this new arrangement a rectangular casing is secured about the fan, and in the front of the same are placed a series of deflector plates arranged to move simultaneously like the leaves of a blind shutter. The fan shaft is projected rearwardly of the motor casing, and means connect this shaft with the deflectors for oscillating them to direct the current of air in different directions. In one instance, this means is in the form of a pivoted lever, the front end of which is connected with the shutters or deflectors, the rear end having an eccentric connection with an upright shaft, the lower end of the shaft being provided with a worm wheel that meshes with a worm upon the fan shaft. In another form the inventor employs an endless belt travelling over suitable pulleys, the deflectors being also provided with pulleys so that they are completely rotated.

Electrical Fly Trap.

An electrical fly trap has been patented by an inventive genius residing in Providence, R. I., Mr. Edwin R. Greene, by name. A frame is employed which is constructed of insulating material and comprises a central longitudinal plate, and top and bottom bars, the whole being connected by intermediate strips. Around this frame are wound sets of positive and negative wires spaced a slight distance apart to form a grid, the spaces between the wires being such that should a fly alight on the grid, it will necessarily touch two wires. Bait is placed upon the center plate within the grid, and the arrangement is connected with an electric current. A horizontal platform is suspended beneath the trap to catch the flies that may be electrocuted. The operation of the device will be apparent. The insects attracted by the bait within the grid will alight upon the wires and be electrocuted, whereupon they will drop down upon the horizontal platform, this platform being so arranged that it may be cleaned as often as desired.

Soldering Iron.

The General Electric Company has obtained a patent on a novel soldering iron. The iron is heated by electricity, and to this end the usual copper point or shank is employed which is surrounded at its rear end by a coil of small wire, the layers being insulated from each other and from the shank by an interposed cord of insulating material wound back and forth in zigzag relation between the same. This forms an open network of wire and insulation through which the air can freely circulate, so that when the coil is heated by its resistance to a current of electricity, the heat will readily reach the shank of the point. An enclosing insulating jacket surrounds the coil to prevent undue radiation of the heat, and to the rear end of this jacket is secured a hollow stem which carries a hollow handle. Through this handle and stem pass the feed wires which are connected to the coil. Bare iron wire is preferably employed in the coil, each wrap being spaced from those adjacent and embedded in the insulating cord so as to be retained in position.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy: twenty copies for \$1.50.—Please give correct data in ordering.—Address

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 Car door mechanism A. B. Bellows
 Car fender M. F. Field
 Car fender C. P. Hu st
 Car. Motor H. Austin
 Car replacer A. J. Michel
 Car station annunciator. Railway G. Hall
 Car transport. Marine railway W. W. Smith
 Car window A. Moffitt
 Cars. Adjustable roof or cover for tram F. Kennington
 Carbureter G. W. H. n s
 Carpet cleaning rack F. V. Johnson
 Carpet rag looper T. A. Clark
 Carpet stretcher A. H. Davis
 Carpets. Apparatus for the manufacture of knot stitch F. Boyer
 Carriage or wagon spring J. Williams
 Carrier and drier L. L. Kelsey
 Cartridge C. A. Bailey
 Carving or copying machine J. Gates
 Cash register W. Knef ans et al
 Cash register T. Carney
 Caster. Furniture J. W. Kennedy
 Casting flask C. A. Palmer
 Casting machine H. L. Bock
 Casting machine 3 pats. C. H. Veeder
 Casting solid or hollow circular bodies S. Michailoff
 Castings. Forming C. H. Veeder
 Castings. Preparing sand molds for steel H. B. Atha
 Cementing machine G. Julian
 Centering machine L. E. Whiton
 Centrifugal machine O. Oh sson
 Chain wheel F. L. Morse
 Chain wrench G. Amborn, Jr
 Chain wrench G. W. Bufford
 Cheese press M. McKinnon
 Chuck. Nipple W. G. Lras
 Churn. Rotary W. D. Carson
 Cigar bunch wrapping machine F. L. Herrington
 Clevis for plows, &c E. Hall
 Clock. Electric E. Meyer
 Cloth cutting machine F. Dodge
 Cloth folding and rolling machine I. Cohen
 Cloth, leather, &c. Means for cutting H. E. Musgrave et al
 Clothes line fastener J. D. Muller
 Clothes line reel I. I. Edgerly
 Clutch. Pneumatic hammer A. C. Murphy
 Coffee torrefying apparatus V. C. Burel et al
 Collapsible box A. Silbiger
 Collar fastener G. H. Wilson
 Combustion producing apparatus L. D. West
 Concentrator M. D. Rochford
 Conduit C. D. Budd
 Confectionery cutter M. A. Smith
 Controller G. J. Kein
 Conveyor G. W. Cross
 Cooking crane T. J. Baskett
 Cooking vessel ventilator A. D. Bentley
 Cooling tub H. T. Myers
 Copper from water. Precipitating A. J. Polmester
 Core making machine I. B. Thomas et al
 Core making machine G. H. Wadsworth et al
 Corn or grain dump and elevator J. Mabus et al
 Cotton picker for forming mattress bats J. W. Morgan
 Crate. Animal H. N. Backus
 Crate. Collapsible H. D. Bokop
 Crate. Egg H. J. Hagstad
 Crate fastener C. W. Hillenbrand
 Crate. Folding R. B. Chritton
 Creaming can F. J. Sleezer
 Crusher A. G. Morris
 Cultivator W. G. Scott
 Cultivator O. R. Baldwin
 Cultivator W. C. Evans
 Cultivator J. A. McClung
 Cultivator and weed cutter J. H. Thompson
 Cultivator arch. Adjustable C. Christensen
 Curler. Hair H. E. M. & D. J. L. Steiner
 Current meter. Alternating 7 pats. P. Duncan
 Current meter. Direct T. E. Adams
 Current regulator. Alternating C. E. Hershberger
 Curtain and drapery bracket D. & W. H. McCarthy
 Curtain bracket E. L. Burns
 Cushion, water bag, and fountain syringe. Combined J. P. Schan
 Cyanids. Making J. D. Darling
 Damper E. M. McCleary
 Damper operating mechanism E. R. Cahoon
 Dental articulator M. M. Kerr
 Dental instrument J. W. McConnell
 Detector bar clip and stop J. Chalmers, Jr
 Display of goods. Utensil for C. N. Heinz
 Distilling apparatus E. Jester
 Distilling apparatus. Water E. E. Murphy
 Door. Automatically operating J. H. Whitaker
 Door closing and holding device J. L. Hamel
 Door. Sliding G. B. Pickop
 Door spring. Adjustable M. Schwartz
 Doubling apparatus C. W. Bray
 Dough manipulating and loaf forming machine E. C. Chase et al
 Dough mixer and kneader H. A. Duc, Jr
 Draft equalizer W. S. Emert
 Draft equalizer T. F. & J. J. Folk
 Draft rigging B. Patterson
 Drapery frame clamp J. J. Park
 Drier F. E. Allen
 Drier E. Storch
 Drying apparatus H. Diedrich
 Drill reciprocating key seating attachment E. W. Kelley
 Drilling machine D. Warner
 Dumping device B. F. Thomas
 Duplicator S. Case
 Dust pan W. L. Harris
 Dust pan, broom, and dust brush holder J. M. Miller
 Duster. Feather E. K. Warren et al
 Dye and making same. Green sulfur C. Ris
 Egg case H. Erickson
 Elastic fabric and making same. Woven A. M. Ziegler
 Electric alarm and fastening device H. G. Carleton
 Electric conductors with or without guard wires. Automatic device for the safe operation of E. E. Schultz et al
 Electric meter 26 pats. T. Duncan
 Elevator A. B. Roney
 Elevator J. Rice
 Elevator controller F. K. Fassett
 Embroidery loop holder M. F. Smith
 End gate and shoveling board. Wagon D. K. Wier
 Engine igniter. Explosive J. V. Rice, Jr
 E. trails. Machine for lacerating or slitting J. W. Kohlhepp et al
 Envelop J. G. Binkert
 Envelop. Document J. G. Wallace
 Evaporating apparatus O. M. Nilson
 Eyeglass polisher H. C. Pigneron
 Eyeglasses W. N. Blanchard
 Eye et H. G. Weibezahl
 Farm gate M. H. Larimore
 Fastening device A. L. Drake
 Fastening C. E. Smith
 Fence. Barbed wire J. H. Bain
 Fence machine. Wire A. C. Mills et al
 Fence post L. A. Thornburg et al
 File for bills, &c F. K. Krag
 File. Index W. E. Ball
 Filter press J. Wilson
 Fire door. Automatic self closing G. M. McClain
 Fire hose shut off J. H. Towers
 Fire screen gate J. W. McLean
 Fire shutter P. Ebner
 Fireproof door, &c. Automatic C. A. Barber
 Fishing. Floating seine net or weir for J. S. Dill
 Flooring for buildings. 2 pats. O. W. Norcross
 Floors, &c. Scraper for C. Ouellette
 Fly screen A. L. Stokesberry
 Folding device E. J. Schuneman
 Fruit box or basket G. H. Williams
 Fuel. Artificial W. R. Peakes
 Furnace ash remover. Boiler D. Campbell
 Furnace blast device C. P. Larsen
 Furnace charging apparatus S. S. Wales
 Furnace filling apparatus. Blast J. Kennedy
 Furnace for heating or smelting metals H. H. Hewitt
 Furnaces. Operating blast J. Kennedy
 Fuse box. Safety J. T. Wats n
 Garment fastening E. Bohn
 Garment hanger M. J. Cook
 Garment stretcher C. A. M. Anderson
 Garment turning apparatus W. G. Jarvis
 Garnet cylinder H. J. Tate
 Gas burner. Heating E. S. Clark
 Gas burner. Incandescent J. W. Blakey
 Gas burning heater A. W. Kent
 Gas generator. Acetylene M. D. Compton
 Gas generator. Acetylene F. H. Merrill et al
 Gas generator. Acetylene T. H. Lewis
 Gas generator. Acetylene O. Falkenwalde
 Gas lighter E. D. Anderson
 Gas saving appliance S. J. Jeha
 Gate E. Phillips
 Gear breaking device. Compensating A. Herschmann
 Gear molding apparatus J. Anderson
 Glass, &c. Apparatus for the manufacture of J. Lohne
 Glass blowing machine H. J. Colburn
 Glass blowing machine L. H. Colburn
 Glass, &c. Electric furnace for making J. Lohne
 Glass making furnace E. Gobbe
 Glass. Manufacturing A. Voelker
 Glassware. Manufacturing hollow J. L. C. V. F. J. P. R. and F. L. Arbogast
 Gluing machine J. Brown
 Gluten. Manufacturing L. A. Morel
 Golf ball 6 pats. E. Kempshall
 Golf balls. Manufacturing 2 pats. E. Kempshall
 Grader. Road B. Strome
 Grain carrier R. H. Overly
 Grapple J. W. Norris
 Grate E. R. Cahoon
 Grate front and stove. Combined C. F. Wilson
 Grid or broiler J. J. Pearce
 Grinding mill J. Brown
 Gun. Automatic L. L. Driggs
 Gun lock D. Brown
 Halter. Rope E. T. Rugg
 Hammer nail holding attachment E. L. Carlisle
 Hammock support C. Smith et al
 Harrow J. H. Mosley
 Harrow tooth fastener J. F. Duffin
 Hat fastener J. N. Brunner
 Hay loader W. McMeans
 Head block or follower J. J. Crowley
 Hearing. Appliance for assisting the P. A. Klawns
 Heel. Cushioned J. H. Melavin
 Heel holder for heel attaching machines F. F. Raymond, 2d
 Heel lift. Boot or shoe J. J. Jones
 Hinge C. Dietz
 Hinge G. A. Wheeler
 Hoisting apparatus D. H. Darrin et al
 Hoisting bucket A. E. Norris et al
 Hook and eye E. E. Chipman
 Hoop forming machine N. E. Brown
 Horse breaker and starting machine J. F. Carr
 Horse detacher E. B. Stearns
 Horseshoe E. Odell et al
 Horseshoe pad H. Christopher
 Hot blast and smoke consumer. Combined J. B. Ehrlich
 Hydrocarbon burner R. Witty
 Ice box cover T. F. Secor
 Ice cream freezer W. A. Soper
 Ice tongs J. A. McMasters
 Indigo. Making resist white under A. J. Stiegelmann
 Injector burner W. Plotts
 Insulation from wire. Implement for stripping C. C. Sibley
 Insulator pins. Sleeve for protecting F. M. Locke
 Ironing machine. Edge G. E. Norris
 Jar closure and fastener H. F. Webb
 Jar lid clamping device. Fruit W. V. Hart
 Jeweler's tool A. A. Nilson
 Journal bearing H. H. Hewitt
 Key operated machines. Actuating mechanism for D. Murray
 Knit fabrics. Manufacture of figured E. A. Hirner
 Knitting machine. Circular K. Paime
 Labeling and wrapping mechanism. Can F. H. Knapp et al
 Lace representing mosaic work. Manufacture of E. E. Sanner
 Ladle. Bottom pouring C. W. Sherman
 Lamp. Electric arc P. H. F. Spies
 Lamp. Electric arc C. Gilbert
 Lamp. Student's A. P. Storrs
 Lamps, glasses, &c. Device for cleaning K. Lurtz
 Lamplighter. Time O. V. Sigurdsson et al
 Lathing machine R. Eder
 Latch T. C. Hamilton
 Leaf turner J. Talbot
 Leather skiving machine B. Fischer
 Lifting and carrying device J. M. Zwerner
 Lifting jack F. H. Ford
 Lifting jack or elevator C. Beierstorf
 Liquid charging and dispensing apparatus C. A. Wikinson
 Liquid meter S. Bouchet
 Liquids of varying densities. Transportable device for drawing constant quantities of A. Musciacco
 Loading beam E. Scharrer
 Lock A. Frederiksen
 Lock 2 pats. H. G. Carleton
 Loco extermiator J. Knight
 Log turner J. J. Skinner
 Log turner T. H. Dillon
 Loom. Filling replenishing W. I. Stimpson
 Loom multiplier mechanism A. S. Cowan et al
 Loom pattern mechanism A. S. Cowan
 Loom stop motion. Ribbon W. I. Post
 Looms. Magnetic feeler for C. P. Bostian
 Low water alarm for automobile tanks. Audible G. E. Whitney
 Mail service apparatus G. A. Owen
 Mallet W. E. Bolster
 Mangle W. H. Baker
 Match ignition material R. E. A. Gans
 Match machine conveyer chain E. M. Lockwood, Jr
 Match safe S. L. Whitehead
 Mattress J. Marshall
 Measuring instrument. Electrical 14 pats. T. Duncan
 Metal shell band and cap J. J. & L. S. Murdock
 Metals from ore, &c. Extraction of B. Hunt
 Metals from their oxid ores. Extracting J. Rudolph et al
 Metals. Preventing oxidation of molten J. H. Walker
 Milk cooler W. C. Black
 Mil s. Skid arm for double cutting band E. E. Thomas
 Mines. Brake for uphauls for C. L. E. Schenk
 Mines. Downhaul for. 2 pats. C. L. E. Schenk
 Mixing machines, &c. Conveyor attachment for C. T. Drake
 Mold mechanism 3 pats. C. H. Veeder
 Mop wringer H. C. White
 Mop wringer A. M. Burnham
 Mortising machine. Window frame F. V. Phillips
 Motion converting mechanism J. M. Ranhoff
 Motor meter 4 pats. T. Duncan
 Motor meter. Alternating current. T. Duncan
 Motor meter. Induction. 3 pats. T. Duncan
 Motor meter. Polyphase T. Duncan
 Multiple effect B. Thoens
 Musical instrument bridge E. E. Jackson
 Musical instrument. Mechanical C. L. Emmons
 Musical instrument valve. Pneumatic M. Clark
 Nebulizer W. & J. Boekel
 Necktie band fastener A. B. Schucker
 Necktie holder J. Udehl
 Needle threader G. Printz
 Net. Trap J. C. Turnipseed
 Nut cracker H. M. Quac-enbush
 Nut lock G. O. Hoy et al
 Nut lock L. Lehotzky et al
 Nut lock. Vehicle axle C. Schaefer
 Nut tapping machine T. Ferry
 Oil burner B. G. Devoe
 Oil cad G. B. Archer
 Oil heater. Carbon L. K. Hosea
 Optometer F. A. Hardy
 Oven N. F. Hoffman
 Package carrier O. M. Gould
 Package fastener and seal W. S. Armstrong
 Paper band C. W. Williams
 Paper for art printing. Treating J. Wezel
 Paper or pulp board making machine L. Atwood
 Paris green. Making R. Franchot
 Pattern cards. Mechanism for producing T. Capper
 Pegging machine A. Graffam
 Pen. Fountain L. E. Waterman
 Pen. Safety fountain L. E. Waterman
 Pen. Stylographic W. W. Sanford
 Permutation lock J. & C. E. Arner
 Phonographic duplication processes. Dipping tank for J. W. Aylsworth et al
 Phonographic reproducer P. Weber
 Photographic lens shade F. W. Nicholson
 Piano guard A. A. Huseby
 Pictorial device J. A. Imhof
 Pipe wrench. Chain G. Amborn, Jr
 Pitman connection J. E. Gundry
 Planter. Cotton seed A. G. Cox
 Planter. Seed A. Gale
 Plastic compound and manufacturing same L. M. Randolph
 Plate forming apparatus A. Sandvig
 Playing ball 6 pats. E. Kempshall
 P. ow fender attachment. Cultivator J. W. Bates
 Pneumatic despatch tube E. A. Fordyce
 Poker support E. R. Cahoon
 Pole strap and collar buckle. Combined A. C. Buttmar
 Precious stones. Apparatus for cutting and polishing F. R. Kneip
 Pressure engine F. J. Hull
 Pressure regulator C. Gulland
 Printing device E. Terrell et al
 Printing machine printing block. Oil cloth E. F. Treiblar
 Printing press inking roll J. P. Marks
 Printing press. Tip J. F. Williams
 Propeller. Screw R. Thaler
 Propeller wheel E. E. Strothman
 Propulsion of ships. Apparatus for the hydraulic L. Vidal
 Pulley. Expansive J. C. Pratt
 Pulp pails. Apparatus for making A. D. Heyl
 Pulverizer J. R. Jones
 Pump. Air G. W. Kellogg
 Pump handle J. M. Lowe
 Pump rod coupling J. M. Lowe
 Pumping mechanism for feeding water to steam boilers C. Crompton
 Punch. Ticket H. Cottrell
 Puncture healing composition W. O. De Mars
 Puzzle L. M. Balbian
 Quill substance. Machine for preparing W. Webster
 Rail bond F. B. Badt et al
 Rail chair or support E. M. Williams
 Rail joint C. E. Wellen
 Rail joint E. Zamborsky
 Railway gate. Automatic N. Risner et al
 Railway rail joint I. Lynd
 Railway rolling stock coupling or uncoupling apparatus J. Jenkins
 Railway spike W. C. Miner
 Railway switch W. W. Hoffman et al

Railway tie.....Z. C. Robbins
 Railway vehicle frame, &c.....S. Riffart
 Railways. Automatic signal for electric.....
 Ranges. Ventilator for fire surfaces of.....
 Razor. Safety.....A. E. Minns
 Refrigerator.....A. de Clairmont
 Registering mechanism.....L. J. Burdick
 Rheostat, electric heater, &c.....H. P. Ball
 Roaster.....W. F. Colley
 Rock drill clamp.....F. R. Brown
 Rod coupling.....W. Connelly
 Roller press.....E. Reagan
 Rolling mill feed table.....E. E. Slick
 Rosin. Hardening.....E. M. Schaal
 Rotary engine, water meter, or pump.....
 Sad iron. Self heating.....H. B. Swartz
 Safety appliance.....H. P. Suman
 Sandpapering machine.....F. Hopkins
 Sand sprinkling machine.....C. F. O'Neil
 Sandal.....J. F. Fish
 Sash lock.....W. Schranweber
 Saw handle clamp.....J. A. Hale
 Saw. Pruning.....G. R. Tyler
 Scale. Price.....L. T. Johnson
 Screen.....W. R. Cochran, Jr.
 Screw plate.....W. J. Baker
 Seed products. Manufacture of.....F. B. Pope
 Seeding and planting machine.....
 Sewer trap.....R. D. Zimmermann
 Sewing machine lower thread tension mechanism.....G. G. Beitzel
 Sewing machine needle bar guiding mechanism.....W. Forsyth
 Sewing machine trimming attachment.....
 Shade roller and bracket therefor.....C. A. Baker
 Shaft support. Vehicle.....J. H. Gregory
 Sheet delivery apparatus.....G. P. Fenner
 Sheet introducing mechanism. Slip. W. Scott
 Sheet metal. Machine for manufacturing expanded.....B. W. L. Caldwell
 Shoe compressor.....S. Rapp
 Shoemaker's jack.....A. T. Draper
 Sieve cleaner. Shaking.....F. L. Shaler
 Signal station.....J. W. Harrison
 Snow compressing machine.....R. Shirreffs
 Snow plow.....C. L. Tolles
 Soldering iron heater.....P. H. Bayley
 Spark arrester.....E. J. Smith
 Speed controller.....F. E. Triunks
 Speed mechanism. Variable.....J. A. Smith
 Speed regulator.....H. T. Wilber
 Speed regulator.....V. G. Apple
 Spinning machines. Vessel or pot for gathering fibers being thrown off.....G. Stieble
 Spittoon. Sanitary.....N. J. Bezudin et al
 Stacker. Straw.....J. R. Buckwalter
 Stage illumination with indirect light.....
 Stair builders. Adjustable form for.....
 Stamping machine.....C. A. Ambrosius
 Starch. Making modified.....L. Cerf
 Station indicator.....W. Smith
 Steam engine.....W. A. Johnson
 Steam generating system.....W. Chesterman
 Steam generators. Means for regulating the supply of water and liquid fuel to.....
 Steel, &c. Apparatus for making.....E. C. Willis
 Steel converter.....S. R. Behrend
 Steering or other purposes. Shifting mechanism for.....G. C. Brooks
 Stereotype plate matrices. Machine for producing.....I. Kitsee
 Sterilizing apparatus.....G. W. Kellogg
 Stiffening cord or tape.....E. K. Warren
 Stocking.....K. Palme
 Stone. Artificial building.....J. C. McClenahan
 Store.....5 pats.....E. R. Cahoon
 Stove air introducer.....E. R. Cahoon
 Stove fire pot.....W. J. Keep
 Stove. Heating.....5 pats.....E. R. Cahoon
 Stove lining.....E. R. Cahoon
 Stove or range.....E. R. Cahoon
 Stovepipe.....G. B. Barclay
 Strainer.....W. Jones
 Street sweeper.....W. Hight
 Structure. Hollow or double walled.....
 Structures sustaining cross strains. Construction of.....M. Weires
 Suit holder.....M. B. Taber
 Suit holder.....C. S. Barrows
 Sulfur candle.....C. H. Shaw
 Suspenders and trousers connection.....2 pats.....
 Switch throwing device.....P. Luther
 Syringe.....C. I. Bush
 Syringe.....F. H. Jones
 Tanbark leaching apparatus.....G. C. Vaughn
 Tank heater.....M. Lynch
 Tappet.....W. & A. McDonald et al
 Tapping device. Beer.....P. Forg
 Teaching writing. Means for.....P. S. Halleck
 Telegraph sounder.....J. A. Albertson
 Telephone toll line apparatus.....T. R. Laing
 Telephone transmitter arms. Base plate for.....C. E. Wilson
 Telephonic wall set.....C. E. Wilson
 Telescopic case.....C. L. Gilbert
 Thill coupling.....G. F. Sprague
 Threshing machine.....E. J. Vraalsstad
 Time detector. Watchman's.....J. Schlenker
 Time recorder.....J. W. Deubner
 Time table holder.....W. F. Barry
 Tin by electrolysis. Obtaining.....E. Quintaine
 Tire.....L. D. Saxton
 Tire filler compound.....A. de Clairmont
 Tire. Link belt.....T. M. Bryson
 Tire setting machine. Rubber.....J. A. Burrows
 Tire tightener.....J. E. Souer
 Tire. Vehicle.....W. McCausland
 Tonguing and grooving machine.....H. A. Holt
 Tool. Combination.....J. Weathers
 Trace holder and detaching means. Combined.....
 Track suspension apparatus.....G. A. Owen
 Traction device.....F. L. Gould
 Traveling case.....H. W. Rosenbaum
 Trolley arm head.....F. J. Ludolph
 Trolley controller.....F. D. Nilloy
 Trolley wheel.....G. Loffi
 Truck. Warehouse.....A. P. Sullivan et al
 Truss. Hernial.....J. C. Le Hardy
 Trussing machine.....L. D. Vogel
 Tufted fabrics. Manufacture of.....C. S. E. Spoerl

Turbine. Continuous combustion.....M. Beck
 Turning caster wheels. Machine for.....
 Twyer.....S. K. Behrend
 Twyer. Furnace.....W. B. Foster
 Type writer.....A. R. Free
 Type writer addressing attachment.....
 Type writing and adding machine.....J. C. Wolfe
 Type writing machine.....L. Sholes
 Type writing machine.....H. S. Shafer
 Valve.....C. W. Hunt
 Valve. Automatic.....F. H. Mason
 Valve. Cylinder drain.....G. Faith et al
 Valve gear.....O. Schmid et al
 Valve. Water cooled.....H. E. Ebbs
 Vault. Burial.....J. C. Hennis
 Vehicle.....A. Herschmann
 Vehicle controller. Electric.....
 Vehicle. Motor.....A. L. Simpson et al
 Vehicle. Motor.....P. J. McMahon
 Vehicle. Motor.....G. W. Smith
 Vehicle. Motor.....W. L. Hight
 Vehicle running gear.....H. W. Koehler
 Vehicle. Speed.....C. Rossler
 Vehicle steering and driving gear. Motor.....
 Vehicle wheel.....R. W. H. Bailey et al
 Vehicles for mechanically operating electric switches. Connection of strikers to motors.....
 Vending machine. Coin controlled.....F. Lynes
 Ventilator.....R. E. Rudolph
 Vermin exterminator.....M. J. Norford et al
 Vise attachment.....S. O. Root
 Wafer. Duplex.....G. A. Barth
 Wagon skein.....A. L. Moore
 Waist holder and skirt supporter. Combined.....
 Warp stop motion mechanism.....W. I. Stimpson
 Washboilers, &c. Attachment for.....
 Water cooler for initiating purposes.....
 Water distribution.....E. & U. S. De Moulin
 Water supply and filtering system.....J. Coles
 Water tube boiler.....S. E. Freeman
 Weather strip.....H. E. Kenny
 Wheel attachment.....T. Oneil
 Wheelbarrow.....E. A. Garver et al
 Whist. Index card for duplicate.....C. W. Neely
 Windlass.....M. B. Weller
 Windmill mechanism.....M. W. Elliott, Jr.
 Window bracket or step.....R. Tove
 Window opener.....J. M. Thorp
 Window screen.....R. B. Fowler
 Window. Self closing.....E. Van Noorden et al
 Window washer.....J. Vain
 Wood fiber cutting machine.....G. E. Le Clair
 Wool, &c., into bags. Mechanism for pressing.....
 Woven figured fabric.....W. Scholes
 Wrapper or label assorting machine.....
 Wrench.....C. E. Votaw
 Wrench.....H. D. Hilliard
 Wrench.....E. Huntley
 Wrench.....W. Rundquist
 Yoke center guard. Neck.....J. F. Vuagniaux
 Zinc gelatose compound.....A. Eichengrün et al

DESIGNS.

Medallion.....C. W. Park
 Ornamental border.....J. H. Gault
 Shield. Ornamental.....2 pats.....S. A. Keller
 Spoons or similar articles. Handle for.....
 Tool stand.....H. G. Smith
 Type ornaments. Font of.....2 pats.....B. Nadall

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MECHANICAL PATENTS.

Abrading tool.....W. M. Rockstroh
 Acid and making same. Indigo diacetic.....
 Acid and making same. Methylene citric.....P. Seidel
 Adding machine.....W. Sternberg
 Adding machine.....B. J. T. Hiatt
 Aerating or agitating liquids. Apparatus for.....
 Air compressor.....H. E. Dolphin
 Air compressor and intercooler.....G. W. Rhine
 Air heater. Compressed.....C. B. Duncan
 Air purifying apparatus.....D. Groove
 Alarm.....M. P. Janisch
 Alloy. Aluminium.....E. Murmann
 Amalgamator.....J. McKelvey
 Animal trap.....J. R. Butler
 Animal trap.....J. M. Heardon
 Annunciator. Automatic.....J. A. Wotton
 Annunciator. Electrical.....C. C. Blake
 Applicator.....G. J. Van Schott
 Apron and apron tie.....W. Garms
 Apron. Child's eating.....E. J. Reed
 Automatic switch.....F. S. Lewis
 Badge or button back.....J. W. & A. M. Ayers
 Bag machi e.....L. D. Benner
 Balls. Manufacturing playing.....E. Kempshall
 Barrel forming machine.....J. C. O. Redington
 Basket cover making machine.....C. Engberg
 Basket handle.....M. Tucker
 Bathing apparatus.....W. J. Stoffel
 Batteries. Cleaning spongy lead plates for storage.....R. N. Chamberlain
 Battery plates. Forming storage.....
 Bearing. Ball.....M. E. Clark
 Bearing. Roller.....C. C. Hubbard
 Beater cover. Revolving or traveling.....
 Bed bottom supporting hanger.....F. Karr
 Bed or seat bottom. Spring.....W. Eyster
 Beet puller.....M. W. Palmer
 Belt fastener for connecting ends of drive belts.....
 Belt roller. Conveyer.....H. F. Larava
 Bevel and try square. Transferring.....
 Bicycle seat or handle bar spring post.....
 Bicycle spring frame.....G. S. Lewis
 Bicycle sprocket wheel.....C. W. Errick
 Binder. Temporary.....A. G. Balluff
 Boat.....J. P. Pool
 Boiler.....J. M. McClellon
 Bolt.....O. C. Earl
 Book. Railway tariff.....W. H. Bonner

Boot or shoe cushioning device.....F. P. McIntyre
 Boots or shoes, &c. Machine for wax treating parts of.....H. H. Beckwith et al
 Boots or shoes. Medium for polishing parts of.....
 Boring apparatus. Deep.....W. Wolski
 Bottle. Non-refillable.....D. K. Snyder
 Bottle. Non-refillable.....J. Zangel
 Bottle. Non-refillable.....J. R. Latham
 Bottle stopper.....G. Lispenard
 Bottle washing machine.....H. S. Brewington
 Bottles or jars. Neck and cover for closing.....
 Box.....A. F. Wilson
 Box.....C. B. Baldwin
 Brake.....H. A. Knox
 Brake.....H. L. Schaffner
 Brake apparatus. Automatic fluid pressure.....
 Brick plant.....G. Westinghouse
 Bricks, tiles, &c. Manufacture of.....B. E. Bechtel
 Brush.....A. J. Keeble
 Brush.....G. R. Richardson
 Brush.....G. H. Beasley
 Buckle.....A. E. Durland
 Buck shield.....G. L. Hempy
 Burner and inhaler.....W. R. Warner
 Butter cutter.....A. Donovan
 Button carding machine.....W. J. Pugh
 Button. Lacing.....W. Renfrew
 Call system. Electric.....F. E. Huggins
 Camera. Panoramic.....J. Forsheim
 Can for holding coarse emery, &c.....
 Can testing machine.....C. W. Boman et al
 Can testing machine.....W. Rubin
 Can testing machine.....E. J. Lewis
 Car brake.....L. T. Pyott
 Car coupling.....J. Burge et al
 Car coupling.....J. H. D. Eagan
 Car grain door.....W. H. Mann et al
 Car. Railway.....H. McCoughlin
 Car seat cleaner.....J. A. Ridd
 Cars. Track scraper attachment for street railway.....
 Carbide feeding mechanism.....J. C. Kemp
 Carbureter.....J. Wilkinson et al
 Carbureter. Explosive engine.....J. F. Duryea
 Carbureting device for internal combustion motors.....C. A. Hamilton
 Carding machine attachment.....C. D. Ingraham
 Carpet and making same. Velvet.....
 Carriage. Collapsible baby.....J. W. Dimick, Jr. et al
 Caster.....A. Katzke
 Caster.....reissue.....A. B. Diss
 Cattle tie and stanchion.....D. C. Markham
 Celluloid articles. Manufacture of.....
 Centrifugal machine.....J. Hackenberg
 Centrifugal machine.....H. McCormack
 Centrifugal machine.....L. Hirt
 Churn.....O. Heintz
 Cider mill apple crusher.....J. F. McDonald
 Cigar machine.....J. S. Winget
 Cigar tray.....H. A. Trenholm
 Clasp.....G. B. Adams
 Cleat. Sheet metal fastening.....F. E. Heinig
 Clock chiming mechanism.....T. J. Fox
 Clock striking mechanism.....H. M. Hunt
 Closet bowls. Waste pipe connection for.....
 Cloth blank folding machine.....C. H. Knapp
 Cloth cutter.....R. E. Leve
 Clutch.....E. Dysterud
 Clutch and stop mechanism.....J. French
 Clutch. Friction.....M. Campbell
 Coaster. Lawu.....H. G. Ralya
 Coat.....J. De Mayo
 Coating machine.....G. A. Breeze
 Coffee, &c. Apparatus for making.....
 Coffee. Machine for the torrefaction of.....
 Coffee pot.....F. C. Thiel
 Collar casting. Horse.....F. N. Wilcox et al
 Collar. Horse.....E. L. Brundage
 Combing and shearing machine. Combined.....
 Compass errors. Device for correcting.....
 Concrete structures. Mold for.....
 Connecting device.....C. F. Lancaster
 Conveyor.....I. Larsen
 Conveyor.....R. A. Zwoyer
 Copper by wet method. Extraction of.....
 Core box cutter.....B. L. Clover et al
 Core making apparatus.....G. J. Hoskins
 Corer and seeder. Fruit.....E. Nyswonger
 Corset fastening.....J. H. Wolcott
 Corset stay tipping machine.....M. D. Watrous
 Cotton chopper.....J. M. Grant
 Cotton picker's sack.....J. H. Holmes
 Cow tail holder.....W. H. Osburn
 Cremator. Refuse.....R. Robinson
 Cuff holder.....W. C. Cortelyou
 Cultivator.....J. A. Betts
 Cultivator.....E. Children
 Cultivator attachment.....F. D. Cook
 Currycomb.....C. P. Breining
 Curtain pole ring.....G. Erich
 Damper. Time controlled.....R. A. Kerr
 Dikes. Protecting.....W. S. Keyes
 Dimethylene tartrate and making same.....
 Dispensing apparatus drip attachment.....
 Display device.....G. W. Boyd
 Door hanger loop.....J. K. Oney
 Door. Sidewalk trap.....T. C. Prouty
 Draft equalizer.....P. H. Jackson
 Drilling machine.....J. Jones
 Drilling machine.....B. F. Kelley
 Dust collector.....J. H. Lane et al
 Dust collector.....E. R. Draver
 Dust spraying machine.....C. H. Asling
 Dynamo.....S. Hutchins
 Dynamos with trucks of railway cars. Means for connecting.....P. Kennedy
 Egg packing compound.....J. M. Stukes
 Egg preserving safe.....R. B. Sears
 Electric combustion furnace.....W. M. Carr
 Electric conductors and making cables. Covering.....H. W. Dover
 Electric controller.....A. C. Eastwood
 Electric coupling.....T. C. James
 Electric cut off switch.....L. W. Richardson
 Electric lights in railway carriages from the guard's van. Device for operating.....
 Electric motor and dynamo machine collectors. Device for cleaning and rubbing.....W. Koppers
 Electric motors. Automatic starter for.....
 Electric switch operating device.....J. E. Putnam

Electric wires and conduits. Outlet box for.....
 Electric wires and conduits.....J. M. G. Fullman
 Electrical apparatus.....T. H. Brady
 Electrical outlet box.....E. W. Muller
 Electrical tap socket.....E. B. Megrawitz
 Electrolytic apparatus.....C. J. Reed
 Elevator door operating device.....H. Bitner
 Elevator door operating mechanism.....
 Elevator door operating mechanism.....C. B. Gilmore
 Elevator door operating mechanism.....J. L. Kall
 Elevator safety appliance.....J. E. Friess
 Elevator safety attachment.....W. A. Forman
 Embossing machine.....I. Clapper
 Embroidery frame.....N. G. Vosler
 Engine.....J. Brauligan et al
 Engine.....L. Richner
 Engines. Sparking igniter for explosive.....
 Exercising device.....R. L. Young
 Expansive bolt.....W. F. Lott
 Extension table.....E. A. Russell
 Extension table.....J. F. Whitel
 Faucet.....F. F. Field
 Feed water siphon and trap. Combined.....
 Fence.....C. Linstrom
 Fence making machine sprayer.....H. Bowen
 Fence making machine sprayer.....W. C. Kneale
 Fence wire stretcher.....E. Schlegel
 Fertilizer distributor.....C. H. Sanford
 File.....J. F. Sullivan
 File, &c. Letter.....C. T. Darrin
 Filter. Barrel.....2 pats.....D. C. Mosher
 Fire escape.....F. Orhmann
 Fish hook.....A. B. Lacey
 Fish plates. Means for forming.....
 Fishing bait holder.....R. B. Charlton
 Flash lamp.....V. Gebhardt
 Flash light apparatus.....G. Collard
 Flash light apparatus.....A. Hemmley
 Floors. Apparatus for applying filters to.....
 Flower stand.....M. A. De Force
 Fluid pressure brake.....M. W. Hibbard
 Foundry sand feeding and tempering apparatus.....A. M. Acklin
 Furnace charging system.....A. B. W. Hodges
 Furnace for progressively heating metal plates or packs.....T. V. Allis
 Furnace mouthpiece. Boiler.....W. H. Donley
 Furnaces. Feeding metal strips in.....T. V. Allis
 Fuse cap.....C. E. Stevens
 Garment supporter.....O. Warlich
 Gas. Apparatus for extracting tar from.....
 Gas. Apparatus for the manufacture of carbureted hydrogen.....P. Plantinga
 Gas burner for firing barrels.....B. Van Steenberg
 Gas generator. Acetylene.....H. G. Rush
 Gas generator. Acetylene.....A. D. Williamson
 Gas generator. Acetylene.....J. S. Wood, Sr.
 Gas generator. Acetylene.....D. N. Long
 Gas generator. Acetylene.....L. Montel
 Gas lighter. Electric.....A. J. Marshall
 Gas service pipes. Antifluctuating device for.....
 Gases. Apparatus for destroying.....R. N. Baylis
 Gases. Vessel for the reception of high pressure.....A. Ludvig
 Gasket and seal for hydrocarbon liquid containers.....P. J. Lockwood
 Gearing. Reversing.....C. W. Wagner
 Glue tank.....O. D. Wetmore
 Golf balls, &c. Manufacture of.....F. H. Richards
 Golf balls. Manufacture of.....E. Kempshall
 Golf club.....E. Kempshall
 Golf club holder.....W. H. Johnson
 Grain bin. Steel.....J. N. Ballou et al
 Grain binder cord cutting knife.....A. H. Neller
 Grate. Round shaking.....F. W. Foster
 Grinding wheel.....G. H. Fowler et al
 Guano distributor.....R. H. Milam
 Gun recoil pad.....J. R. Winters
 Guns. Single trigger mechanism for double.....
 Hame fastener. Adjustable.....C. E. De Long
 Hammer.....F. J. Boyle
 Harrow and roller. Combined.....I. E. Palmer
 Harvester and husker. Corn.....J. Stout
 Harvester.....T. P. & H. Weichel
 Harvester. Beet.....M. W. Palmer
 Harvester knotter attachment.....D. L. Wolf
 Harvesting machine.....A. T. Zetterlund
 Hat or dress fastener.....M. Osborn
 Hats and articles produced thereby. Making.....
 Hatchway door safety gate.....J. H. Neave
 Hay loader and press. Combined.....D. C. Meeker et al
 Hay rake. Horse.....W. F. Ramsey et al
 Heating furnace for coiled bundles.....S. B. Hendricks
 Heel. Boot or shoe.....A. R. Hunt et al
 Heel cushion.....J. G. Rea
 Heel cushion.....O. Eick
 Heel. Detachable.....M. L. Hansen
 Hinge fastener. Detachable.....E. H. Jackson
 Hoisting bucket.....A. E. Norris
 Hook and eye.....J. Fryer
 Hook and eye.....L. Reaser
 Horseshoe. Soft tread.....O. E. Dyson
 Hose and electric signaling device. Combined.....
 Hose coupling.....H. T. Cronk
 Hose nozzle.....J. J. Bowes, Jr.
 Hose nozzle.....H. Gibbs
 Hose nozzle.....H. F. Neumeyer
 Hose reel.....J. McKee
 Hot air register.....A. O. Jones
 Hot water boiler. Sectional.....B. F. Behrendt
 Hydraulic motor.....F. Kozze
 Hydrocarbon burner.....R. H. Fullaway
 Hydrocarbon motor. Double cylinder.....F. Durr
 Ice cream cabinet.....J. Hurley
 Ice tray.....T. W. Henning
 Incandescent burner. Welsbach or other.....
 Inhaler.....V. H. Slinak
 Inlet and catch basin.....E. Stevens
 Insulating composition and producing same.....
 Insulating covering strands and forming same into cables. Apparatus for.....H. W. Dover
 Junction or fuse box.....M. H. Johnson
 Kneading board.....L. D. Patten
 Knife and making same.....H. C. Hart
 Knob. Door.....W. F. Gilbert
 Ladder. Trussed scaling.....G. A. Edmonson et al
 Lamp. Electric arc.....A. Lees
 Lamp. Electric arc.....J. S. Nowotny
 Lamps. Treating ballast wires for electric.....
 Lantern. Signal.....H. N. Potter
 Lantern. Signal.....E. B. Hughes
 Lantern. Signal.....G. A. E. Ruebel

Lathe..... L. G. Merritt
 Lathe tool carriage..... W. F. Barnes
 Lathe turret stop..... B. M. W. Hanson
 Lead press..... R. F. Hall
 Leather articles. Machine for buffing..... J. R. Scott
 Liquid feed regulating mechanism..... D. T. Sharples
 Lock and latch. Combined..... E. A. Fagel
 Locomotive with driven boggy..... C. Hagans
 Loom shuttle check..... J. C. Bryan
 Lubricator..... O. G. Kipp
 Mail box..... J. E. Walsh
 Mail box locking system..... J. E. Walsh
 Mail pouch address and fastening attachment..... H. D. Weller
 Mail service apparatus..... 2 pats. G. A. Owen
 Map or chart case..... J. E. Doldt
 Match machine..... S. Backus
 Measuring device. Liquid..... S. E. Humphreys
 Metal articles. Machine for finishing..... H. H. Burns
 Metal plates or packs. Feeding and heating..... T. V. Allis
 Metal strips, &c. Gripping mechanism for feeding..... W. Fehr
 Metals and producing alloys thereof. Reducing..... B. S. Blackmore
 Meter box connection..... J. J. Hoppes
 Mine cage chair..... J. O. Bardill
 Mitten..... F. Bertheau
 Mop head..... 4 pats. A. S. Held
 Mortising machine. Hinge..... J. A. MacKenzie
 Music leaf turner..... B. F. D. Miller
 Necktie..... T. F. Dunn
 Necktie fastener..... J. H. McQuaid
 Needle. Tape..... J. A. Hutchinson
 Nut cracker..... J. A. Hutchinson
 Oil. Refining..... E. Rocca
 Oil refining apparatus..... E. Rocca
 Ordnance. Firing attachment for breach loading..... J. W. Stockett
 Ore treating apparatus..... A. M. Dorr et al
 Ores. Treating..... A. M. Dorr et al
 Overalls..... R. S. Breckenridge
 Oyster trimming machine..... E. D. Johnston
 Package. Shipping..... G. F. Samberg
 Padlock..... J. M. Cole
 Pail. Nestable..... F. G. O. Ehle
 Paint drier..... D. J. Ogilvy
 Paper box machines. Adjustable form for..... C. I. Rhodes
 Paper display rack. Wall..... O. Blakeley
 Paper or the like. Implement for cutting..... H. J. Smith
 Pen..... F. J. W. Fischer
 Pen. Fountain..... R. B. Dickie
 Phonograph time indicator..... J. Kemmer, Jr
 Photographic plates. Storage box for..... A. Wagner
 Pipe and flue cleaner..... C. F. Craddock et al
 Pip crimper. Sheet metal..... M. L. Hunker
 Pitman..... G. Wilson
 Planter..... J. J. Olinger
 Pliers. Hose..... J. F. Sargent, Jr
 Pliers. Wire twisting..... J. R. Gorsuch
 Pocket. Safety watch..... M. M. Strauss
 Postmarking and stamp canceling machine..... J. E. Wright
 Power press..... G. R. Tennant
 Printer's chase..... D. S. McGreal
 Printing apparatus. Blue..... S. B. Whinery
 Printing forms. Machine for facilitating the production of intaglio..... G. F. McIudoe
 Printing machine..... R. L. Shepherd et al
 Printing machine. Rotary color..... W. P. Wrightson
 Printing machine. Universal..... C. L. Dawson
 Printing press delivery mechanism..... A. J. Hood
 Printing presses. Apparatus for dispelling electricity in delivering sheets into or from..... F. A. Eyler
 Projectile and time fuse therefor..... W. Ruegg
 Propeller shafts. Coupling for ships..... J. Verity
 Pulley..... F. Albert
 Pump..... A. S. Cardella
 Pump. Force..... O. O. Branna
 Punch. Hand..... S. C. Morrill
 Punching machine..... D. R. McLaren
 Rail and bracket connection..... J. H. Lawrence
 Rail bond..... A. H. Englund
 Railings, &c. Coupling for..... J. Finnegan
 Rail joint connection..... O. Nordin
 Railway block system..... J. S. Matson
 Railway. Electric..... A. A. Stolle
 Railway rail..... C. E. Hooven et al
 Railway signaling and switching apparatus..... J. D. Taylor
 Railway system..... J. D. Reed
 Railway wagon hand power brake..... D. J. Morgan
 Railways. Rail for minimizing jolting on..... O. Wilhelmi
 Raisin seeder..... F. J. del Corral
 Recording messages, signals, &c..... P. O. Pedersen
 Reducing mechanism..... W. S. McKinney
 Refrigerator car..... J. B. Underwood
 Revolution indicator..... W. R. Park
 Revolution indicator..... B. T. Williston
 Ring polishing machine..... G. H. Gaskins
 Rocking horse. Traveling..... R. Barrett
 Roll..... R. B. Charlton
 Rolling metal sheets..... T. V. Allis
 Rolling metal sheets in packs. Hot..... T. V. Allis
 Rolling mill conveyer and guide..... T. V. Allis
 Rolling mill furnace..... T. V. Allis
 Rubber boot or shoe..... J. L. Perry
 Ruffler..... W. R. Parsons
 Salts. Treating solutions of..... C. J. Reed
 Sand blast..... R. C. Newhouse
 Sanding and polishing machine..... D. T. Clemons
 Sash fastener..... J. F. & N. N. Neher
 Sash fastener..... J. W. Lyon
 Sash fastener..... J. H. Scriveus
 Saw filig device..... L. M. Miller
 Screw cutting tool..... J. J. Burke
 Seed dropper..... S. A. Loring
 Sewage. Apparatus for the treatment of..... A. J. Provost, Jr
 Sewer catch basin..... W. J. Hough
 Sewed articles. Seam for..... J. W. Smith
 Sewing machine. Eyelet hole..... C. A. Dahl
 Sewing machine treadle foot clip..... A. Eppich
 Shade hanger. Window..... J. C. Wallace
 Sheet metal heating furnace..... J. E. & B. Jones
 Sheet metal sections. Packaging..... G. P. Hobbs
 Sheet metal vessels hermetically tight. Rendering joints of..... W. Thompson
 Ships' hulls. Means for cleaning..... W. S. Burt

Shirt..... D. L. Block
 Shot spreader..... D. Brown
 Sifter. Ash..... H. M. Austin
 Sign. Advertising..... L. J. Hunter
 Sign. Vacuum tube..... D. M. Moore
 Signal apparatus..... S. C. Shaffner
 Silk. Preparation of collodion for the manufacture of artificial..... J. Douge
 Silo..... S. P. White
 Skirt and waist supporter..... J. C. McDonald
 Skirt clasp and waist retainer. Combined..... W. C. Contelony
 Sleigh..... F. F. Long
 Sole edge setter. Rotary..... H. A. Webster
 Spinning, doubling, or twisting machine. Ring..... P. P. Craven
 Spinning machine traverse motion..... O. L. Owen
 Spinning or twisting frame..... L. W. Campbell
 Spraying machine..... L. Doerr
 Stanchion..... E. Prescott
 Steam trap..... J. W. Hodges
 Steering mechanism. Hydraulic..... J. Christensen
 Stirrup..... W. H. Aughey et al
 Stone. Artificial building..... C. W. Stevens
 Stone, &c. Machine for handling..... S. F. Welch
 Stone. Making artificial..... C. W. Stevens
 Stone or brick. Building..... J. W. Lahmann
 Storage battery..... J. Redding
 Stove. Heating..... C. Weaver
 Stove top..... F. B. Whitlock
 Swine from rooting, &c. Device for preventing..... S. J. Brighton
 Swing..... G. S. Kerr
 Switch actuating mechanism..... J. P. Hasty
 Switch operating apparatus..... C. E. Jackson
 Tackle block..... E. B. Hammond
 Tag. Marking..... L. T. Arnold
 Tag or check..... W. F. Connor
 Tail board spring..... F. Nickerson, Jr
 Teaching apparatus. Music..... J. E. Forfar
 Telegraph system. Wireless..... C. D. Ehret
 Telegraphic distribution..... H. A. Rowland
 Telegraphic page printer..... H. A. Rowland
 Telephone circuit system..... E. F. Frost
 Telephone switchboards. Combination drop and jack for..... H. M. Fisk
 Telescope mount..... B. A. Fiske
 Telescope. Prismatic binocular..... F. H. Hill
 Thill coupling..... B. G. Foster
 Threshing machine band cutter and feeder..... I. J. Ross
 Ticket. Railway..... A. I. Blanchard
 Tiling apparatus..... S. Pasco
 Tobacco pipe..... A. K. Bowman
 Tool. Combination..... S. A. Moe
 Tool handle..... W. A. Holliday
 Toy. Mechanical..... G. E. Paton
 Toy or game apparatus..... C. H. Buxton
 Treadle motor..... G. Holtz
 Trolley stand..... C. G. Bleasdale
 Trolley wheel turning machine..... B. Gallagher
 Trousers bottoms. Machine for finishing..... W. Heiler
 Trunk and display case..... C. Heumader
 Tug. Shaft..... H. A. Bierley
 Turbine..... E. C. Thrupp
 Tweezers with shank all in one piece..... G. Havell
 Twisting and spinning fibrous materials. Machine for..... J. Marshall
 Type containing channel..... L. K. Johnson et al
 Type distributing apparatus..... A. A. Low et al
 Typewriter..... F. H. Fry
 Typewriter..... T. R. Austin
 Type writing machine..... Z. G. Sholes
 Type writing machine..... R. Horstmann et al
 Type writing machine..... F. M. Wagner
 Type writing machine..... H. Jarvis
 Type writing machine letter or space indicating scale..... C. R. Hoag
 Umbrella cover fastening..... A. G. Stouder
 Universal joint..... J. Jetter
 Valve and device for operating same. Boiler-feed regulating..... H. Cook
 Valve for gas engines. Balanced..... S. H. Dyer
 Vault or grave..... T. D. Hankins et al
 Vehicle body..... J. E. & C. B. Brown
 Vehicle body raiser..... W. Marin
 Vehicle. Dumping..... T. Hill
 Vehicle. Motor..... J. E. Caps
 Vehicle. Motor..... J. E. Thornycroft
 Vehicle. Motor..... H. P. Maxim
 Vehicle running gear..... E. J. Pennington
 Vehicle seat..... L. B. Truslow
 Vehicles. Means for automatic control of motor..... H. H. Sherker
 Vending machine. Coin controlled newspaper..... A. D. Smith
 Veneer cutting machine..... 2 pats. L. G. Merritt
 Ventilating apparatus..... J. W. Titus
 Violin strings. Making preservatives for..... P. Lutz
 Vise..... W. E. Snediker
 Vote counting frame..... T. C. Orndorff
 Wagon. Dumping..... M. Van Wageningen
 Warming machine..... J. W. Dimick, Jr et al
 Warming machine creel..... T. C. Euiwistle
 Washing machine gearing..... F. C. Kainer
 Water meter and recorder..... W. G. Kent
 Water motor. Chain..... G. E. Thurston
 Water wheel governor. Hydraulic..... W. J. Bridger
 Waterer. Stock..... C. C. & C. J. Quinn
 Weighing and measuring machine..... A. P. Johnstone
 Weighing machine..... C. B. Comegys
 Wick. Lamp..... H. Weston
 Window bracket..... C. E. Moulton
 Window lock. Automatic ventilating..... W. C. Martin
 Window screen..... F. C. & A. G. Eastman
 Windows. Safety appliance for use in cleaning..... H. Goldenfarb
 Wire stretcher, cutter, splicer, and staple puller. Combined..... J. Mossman
 Wood grinding machine..... H. Wegerer
 Wrapping pamphlets, &c. Machine for..... E. P. Sheldon
 Wrench..... W. J. Quinn
 Wrench..... A. Bond

DESIGNS.

Bottle..... R. Hudnut
 Brushes, mirrors, or similar articles. Back for..... S. A. Keller
 Button..... E. T. Harkrader
 Casket body..... J. Maxwell
 Chair back..... 2 pats. A. Wanner, Jr

Flushing tank..... 3 pats. C. Schossow
 Glass dish..... 2 pats. W. S. Clark
 Harness rein guide..... J. H. Alexander
 Lamp chimney..... G. W. Blair
 Sewing machine cabinet..... T. Kundtz

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MECHANICAL PATENTS.

Addressing machine..... F. D. Belknap
 Advertising device..... C. F. Schell
 Album for clothing patterns, drawings, &c..... K. A. Johansson
 Annealing silver, &c. Apparatus for..... C. Stickney
 Anti offset device..... R. C. Seymour
 Arch bar..... T. C. Seyveter
 Arm rest. Book..... J. Barker
 Armature winding for electric motors. System of..... T. J. Murphy
 Armor..... J. J. Pindak
 Axle. Locomotive driving..... C. Hagans
 Back pedaling brake..... F. C. Atherton et al
 Bail..... A. Wiedenbauer
 Bales. Core driver for round lap..... M. Swenson
 Baling machine..... A. D. Thomas
 Baling press..... T. J. Corning
 Bandage. Analgetic..... T. L. Ray
 Barrel cover..... 2 pats. J. F. Morin
 Bath appliance..... C. Campbell
 Battery grids. Machine for making..... W. F. Richards
 Beams. Attachment for uniting metal or wood..... J. T. Richards
 Bearing. Conical roller..... J. B. Larned et al
 Bed. Folding sofa..... E. C. Hartshorn
 Bedstead..... I. Charlton
 Binder. Temporary..... F. L. Clark
 Binding case for pamphlets, &c..... F. L. Clark
 Blinds. Means for actuating window..... D. W. Roberts
 Boat or vessel..... J. F. Becker
 Body kneader..... C. E. Gerling
 Boiler..... E. L. Moore
 Boiler brace..... J. S. Worth et al
 Boring machine work holding device..... M. Young
 Bottle carrying means..... H. M. A. Harders
 Bottle for preventing refilling..... J. F. McConaghy et al
 Bottle safety attachment. Poison..... C. J. Siebenhaar
 Bottle stopper..... J. Heard
 Bottling machine..... H. Gruenebaum
 Box lid and tag support..... G. W. Hartman
 Boxes. Metal strip or clamp for use in manufacture of cardboard..... M. R. Partzsch
 Brake beam finger guard..... H. Williams, Jr
 Brake beam finger guard clip..... J. T. W. Rudesill
 Brake beams. Reversible guard finger clamp for..... C. F. Huntton
 Breach block and lever connection..... C. P. Fay
 Broom corn knife..... G. A. Larson et al
 Brush..... A. Gissler
 Brush and tooth powder holder. Tooth..... B. C. H. Simpson et al
 Brush. Flat..... W. H. Humphrey
 Buggy top support..... W. E. Strange
 Building construction..... M. A. Winget
 Burglar alarm and door lock..... L. H. Handy et al
 Burglar alarm. Safe..... I. J. Emory
 Burial case protector..... H. D. Clark
 Bushing. Adjustable..... S. P. Buck
 Button drilling machine..... A. A. Coyle
 Button fly scalloping machine..... J. G. Grall
 Button setting machine..... F. E. Stanley
 Buttonhole portions of articles of apparel. Repair strip for..... J. P. Stout
 Cabinet. Kitchen..... J. P. Pallansch
 Calculating machine..... L. Y. McConnell et al
 Calendar..... M. Lichter
 Calendar. Door..... G. W. Edmondson
 Calipers. Micrometer..... G. H. Radcliffe
 Camera..... H. Goodwin
 Camera focusing attachment..... F. W. Saxby
 Can heading machine. Automatic..... (reissue)
 A. W. Livingston
 Can opener..... J. D. Bolton
 Can opener. Fruit..... M. Monahan et al
 Can or like closure..... A. B. McNairy
 Canning corn, &c..... C. H. Plummer et al
 Candy molding machine..... A. Reiche
 Canteen..... M. L. Missotten
 Car and door therefor. Hopper..... R. V. Sage
 Car brake..... (reissue) H. J. Small
 Car door. Dumping..... R. V. Sage
 Car fender..... W. Sullivan
 Car fender. Street..... A. W. Shank
 Car. Gondola..... H. S. Hart
 Car loader..... 2 pats. E. H. Reynolds
 Car or locomotive. Electric motor..... C. de Kardo
 Carbureter..... D. Best
 Carbureter..... A. L. Mangin
 Carpenter's tool..... J. U. Duby
 Carriage lock..... A. G. Snell
 Casing point or strainer..... A. E. Carlson
 Caster..... N. Davis
 Caster..... J. P. Kelly
 Cattle guard..... E. T. Meador
 Cattle holder..... J. E. & W. Terrell et al
 Ceiling block..... C. W. Dixon
 Cellulose. Machine for separating and cleaning corn..... B. G. Krapf
 Chain making machine..... W. L. Judson
 Chains. Mechanism for securing lags to carrier..... C. G. Carlisle et al
 Chair..... A. J. Peddy
 Chair..... J. F. Moore
 Chart for recording ancestry..... G. Guild
 Cigar bunching machine..... M. M. Gardner
 Cigar perforating machine..... N. P. Pearson
 Cigarette machine..... F. D. Beattie
 Cigarette machine..... J. C. Hansen-Ellehammer
 Circuit controller..... R. Herman
 Clamp..... C. R. Davis
 Clothes line..... A. A. Woodyatt
 Clothes line reel and stretcher..... C. O. Anderson
 Clutch..... M. C. Johnson
 Coach or go cart. Baby..... A. R. Lamplugh
 Coach or go cart. Baby..... 2 pats. A. R. Lamplugh et al
 Cock. Gas stop..... M. R. Colvin
 Collar foundation..... B. S. Nichols
 Combination lock..... W. H. S. Moore
 Concrete mixing apparatus..... C. T. Drake
 Condenser for steam motor carriages..... F. W. Turner

Condensing apparatus..... E. R. Edson
 Confectioner's molder or printer. Shear motion..... H. O. Kellogg
 Cooling appliance..... T. S. Armstrong
 Cotton chopper..... W. R. Wilkinsou
 Cotton press..... 2 pats. A. D. Thomas
 Couch roll guard board..... J. A. Connelly
 Crane. Hydraulic..... E. C. Wiley
 Cream cooler. Automatic..... M. B. Miller
 Cultivator. Corn..... C. M. Carlson
 Cultivator. Hand..... J. R. Williams
 Curtain holder..... C. Heyer
 Curtain pole..... G. Poschmann
 Curtain stretcher..... H. E. Howard
 Cycle. Motor..... W. H. Muzzy
 Demagnetizer..... G. Boettger
 Dental impression tray..... E. L. Townsend
 Dental mallet..... J. W. Thatcher
 Dental vulcanizer..... J. S. Campbell
 Desk and seat. Adjustable..... C. H. Woodruff
 Diamonds in metal. Machine for setting..... J. Brejcha
 Diffusing vaporizable substances. Apparatus..... J. D. Campbell et al
 Disinfecting device for sink drains..... J. F. Seabury et al
 Disintegrating machine..... J. M. MacDonald
 Display device. Necktie..... H. Runtz
 Door mat. Metal..... (reissue) J. W. Horner
 Drainer. Cellar or cistern..... W. D. Labadie
 Drawing instrument..... M. C. Zange
 Dry kiln..... E. Gerrard
 Dumping apparatus..... J. Egli
 Egg candle..... H. H. Holtan
 Electric cables. Manufacture of..... J. H. West
 Electric circuit safety fuse..... D. G. Black
 Electric controller..... J. C. Heury
 Electric furnace..... G. de Chalmot
 Electric generator..... J. M. Wilson
 Electric heater..... M. C. Burt
 Electric lights. Water tight fixture for..... F. J. Russell
 Electric meter..... G. A. Scheffer
 Electric signal device..... T. J. Hoover
 Electrolysis. Apparatus for fused bath..... C. W. Roepper et al
 Electrolytic apparatus for manufacturing certain salts suitable for the subsequent production of chlorin..... G. J. Atkins
 Electrolytic converter..... F. H. Long
 Electromagnetic apparatus. Polarized..... F. B. Cook
 Enameling fork for bath tubs..... E. Dithridge
 End gate fastener..... A. A. Kellogg
 Engine..... G. E. Whitney
 Engine lubricator..... W. J. & G. Lane
 Engine sparking apparatus. Gasoline..... J. W. Stanton
 Envelop and blank therefor..... A. J. Johnston
 Eraser..... E. Swenson
 Eraser tip for pencils..... W. H. Brownell
 Erasers. Machine for cleaning blackboard..... J. A. Jones
 Evaporating apparatus. Vacuum..... G. N. Vis
 Eyeglasses..... L. A. & L. J. Bachus
 Eyeglasses..... P. Z. McDonald
 Eyelet..... E. Kempshall
 Fan..... C. D. Pierce
 Fare collecting apparatus for street cars, &c. Automatic..... L. Perlether
 Fats or the like. Apparatus for the recovery of..... C. Kremer
 Feather cleaning machine..... H. W. Pennypacker
 Feed apparatus. Automatic..... F. Woerner
 Feed apparatus. Measured..... S. B. Newberry
 Feed rolls..... (reissue) C. W. H. Blood
 Feed water cleaner..... D. B. Morison
 Feed water. Heating..... F. H. Trevithick
 Fence..... L. M. Runyon
 Fence post..... F. A. Peebles
 Fence. Wire..... F. W. & J. G. Opel
 Fences. Machine for weaving cross wires in..... N. Steele et al
 Ferrule for awl or knife handles..... E. Edwards
 Fiber separating machine..... S. B. Allison
 File..... H. F. Engleking
 Filtering apparatus. Waste oil..... J. W. Evans
 Firearm. Magazine..... S. Paradis
 Fire escape and fire alarm folding ladder..... R. Nicholls
 Fire extinguishing system. Automatic hydraulic..... J. Curry
 Fire resisting window..... T. Lee
 Fires or accidents. Apparatus for the stoppage of water from automatic sprinkler heads after..... T. Tipping et al
 Fish hook..... J. M. Pyott, Jr
 Fishing device..... J. Seiler
 Fishing reel..... M. A. Shipley
 Flat iron heater..... W. F. Nicholas
 Float ball..... A. W. Ayling et al
 Flooring gage..... W. W. Crim
 Fly exit for screens..... C. F. Working
 Folding box..... J. C. Hoyer
 Foot rest..... L. Woerner
 Freezing can. Water..... E. Stutz
 Furnace..... E. H. Gowing
 Furnace grate bar..... M. Sherman
 Furniture. Baby..... W. P. Abell
 Fuse setting apparatus. Time..... C. P. E. Schneider et al
 Galvanic battery. Reversible..... 2 pats. T. A. Edison
 Garment hanger..... J. Johnson
 Gas burner mantle support..... H. H. Tibbs
 Gas distributing system..... M. Toltz et al
 Gas fixture..... G. F. Bryan
 Gas generating apparatus. Acetylene..... A. E. Adolfsson
 Gas generator. Acetylene..... W. H. Bazley
 Gas generator. Formaldehyde..... R. W. Carman et al
 Gas heated iron..... B. N. Hawes
 Gas meter..... E. R. Ellsworth
 Gas retort..... C. W. Isbell
 Gauntlet..... I. Mendelsohn
 Glass furnace..... J. P. Putallaz
 Gold separator..... R. C. Lester
 Golf ball..... 2 pats. E. Kempshall
 Golf balls. Manufacture of..... 2 pats. F. H. Richards
 Governor..... R. Conrad
 Governor..... E. J. Armstrong
 Governor. Automatic cut off..... G. Strong
 Grader..... E. Williams
 Grain loader..... B. F. Sienker
 Grate..... T. H. Lucas
 Gun carriage..... K. Deulin
 Halter. Operating..... R. W. Ellis
 Handle bar..... L. N. W. Smith

Harvester reel.....B. A. Selph
Headlight. Motor car.....C. Reinker
Heating apparatus. Steam.....S. G. Phillips
Heel. Boot or shoe.....F. G. Saylor
Hinge.....J. M. Upton et al
Hinge. Detachable.....G. B. Pickop
Hinge. Separable screen.....M. W. Murray
Hoist for unloading ships.....W. E. Hutchings
Hoisting and dumping apparatus.....C. A. Morris
Hoisting apparatus.....S. S. Waes
Hoof pad. Antislipping.....J. H. Mitchell
Horse detacher.....C. J. Mrsny
Horseshoe.....C. S. Ruben
Horseshoe calk.....J. E. Cunningham
Horseshoe calk.....E. F. La Clair
Hose rack.....E. Cliff
Hosiery. Manufacture of open striped.....E. A. Hirner
Hub. Wheel.....L. T. Gibbs
Hydro extractor. Continuous.....L. Atwood
Implement. Pocket.....J. Taylor et al
Incandescent burner. Welsbach or other.....T. Stites
Incrustation preventive.....E. Holm
Insulator.....H. F. Kretzer
Iron—flat and angle. Machine for bending.....W. Vollmer
Ironing stand.....A. F. Hyson et al
Ironing table. Folding.....W. E. Knapp
Knitting machine.....W. H. Sheridan
Labeling machine. Bottle.....C. Leffler
Lacing hook.....E. Kempshall
Lacing hook. Shoe.....2 pats. F. E. Vandercook
Lacing. Shoe.....H. W. Hiller
Ladder. Step.....H. L. Frizell
Lamp. Formaldehyde (reissue).....R. P. Kubn
Lamp. Hydrocarbon.....C. H. De Voll
Lamp or gas burner heating attachment.....E. H. Truax
Land roller.....C. K. Longenecker
Last. Hinged.....J. T. Brown
Lath. Turret.....J. P. Lavigne
Leather stretching device.....J. Caldwell
Leaves, &c. Live wood wall for.....J. Patten
Linoleum press.....H. W. Godfrey
Linotype matrix.....P. T. Dodge
Linotype slug holder.....G. E. Wallin
Loading or unloading apparatus.....D. J. Farthing
Lock.....C. H. Bridgen
Lock.....E. Weber et al
Locomotive boiler.....S. G. Crossley
Logging truck (reissue).....J. Lindsey
Loom. Narrow ware.....H. Riehl, Jr
Loom. Ribbon.....2 pats. R. Kohlhaas
Mail box.....D. B. Crafts
Mangle.....D. Lumgair
Marble, stone, &c. Coloring.....W. G. & A. C. Roach
Marl. Apparatus for digging, treating, and delivering.....C. J. Reilly et al
Match box holder.....A. H. Doty
Measure. Rotary.....J. F. Steckenreiter
Measuring apparatus.....F. Huff
Measuring instrument. Electrical.....V. Arcioni
Meat. Preserving.....H. von Rom
Mechanical movement.....J. W. Sharrard et al
Medical battery.....F. Greer
Merchandise. Structure for storage and delivery of.....R. E. Leatham
Metal. Making leaf.....F. Haenle
Metal wheels. Machine for making.....E. Einfeldt
Metal wheels. Making.....E. Einfeldt
Metallurgical furnace.....J. A. Hunter
Milk and cream during the process of separation. Means for ventilating.....A. H. Borgstrom
Mining machine. Coal.....J. Burton et al
Mirror bracket.....S. Svendsgaard
Mixing machine vehicles, &c. Drawing mechanism for.....C. T. Drake
Molding machine. Core.....J. M. Pyott, Jr
Mop and wringer therefor.....E. Hilker
Mower or harvester finger bar attachment.....W. Gattermann
Musical sounder.....H. Rodemeyer
Nipple. Child's teething.....W. Howell
Nozzle.....J. Bean
Nozzle. Spray.....E. Martiu
Nut lock.....E. S. Morris
Ore roasting and cooling apparatus.....W. C. Davis
Oven.....F. Rademacher
Oven. Bake.....W. Clauss
Overshoe fastener.....E. H. King
Packing device.....G. Thom
Paper bag machine.....D. Appel
Paper cutting machines. Knife for guillotine.....T. B. Kendell
Paper fastener.....H. Trenchard, Jr
Paper, &c. Machine for perforating.....J. B. Brow
Pencil sharpener.....E. L. McDivitt
Photographic plate holder.....J. Goddard
Photographic roll holder.....D. H. Houston
Photographic shutter controlling device.....J. Poliakoff
Photoprinting and vignetting frame. Combined.....W. Armstrong et al
Piano. Wireless.....I. F. Gilmore
Pianos. Automatic attachment for.....J. A. Smith
Pin wheel and star wheel motion.....J. T. Cyr
Pipe or tube sawing machine.....H. W. Hathorn
Pipe wrench.....C. C. Longard
Pipe wrench.....H. F. Renner
Planter and fertilizer distributor. Combined cotton.....F. M. Hudgins
Planter. Check row.....W. La Follette
Planter. Corn.....L. P. Graham
Planter. Seed or potato.....C. H. Gerling
Plastic compound and manufacturing same.....L. M. Randolph
Playing ball.....F. H. Richards
Playing ball.....2 pats. E. Kempshall
Pliers.....P. Broadbooks
Plow.....J. Sanders
Plow. Ridging.....J. C. Silveira
Pneumatic shovel.....L. Hanchett et al
Portable seat.....J. L. Smith
Potential regulator.....R. A. Philip
Power for operating rotary machinery. Machine for the tangential application of reciprocating or other.....E. D. Swift
Power indicator.....H. Muller
Press.....J. P. Williams
Printing apparatus. Stencil.....D. Gestetner
Printing machine.....T. Cossar
Printing machine sheet delivery apparatus.....C. P. Cottrell
Printing machine sheet delivery mechanism.....

.....C. P. Cottrell
Printing machine. Yarn.....J. Hamilton
Printing press.....E. Higgins
Printing press attachment.....E. C. Simpson
Printing press controller. Automatic.....T. C. Dexter
Printing press. Envelop.....W. G. Johnston
Pulley attachment.....L. C. Coulter
Pump tube coupling. Chain.....L. A. Brigel, Jr
Pumping apparatus.....J. Albrechtsen
Quicksilver furnace.....R. Scott
Rail bond construction.....E. G. Thomas
Rail clamp.....A. M. White
Rail joint.....J. Thraikill
Rail joint.....C. B. Mead
Rail joint bed plate.....J. H. Whitmyer
Railway. Electric.....4 pats. C. J. Kintner
Railways of the sectional type of conductors or rails. System of electric.....C. J. Kintner
Railway. Pleasure.....N. Lachase
Railway rails. Reconstructing.....V. T. Lynch
Railway system. Electric.....G. L. Campbell
Railway track lubricator.....F. M. De Lapp
Ratchet drill stock and screw driver.....B. Novin
Recording mechanism. Collection.....G. F. De Groot et al
Reel.....G. R. Mathews
Register.....R. Reeves
Rendering and drying apparatus.....J. Glatz
Respirometer.....A. E. Aldrich
Reversing device.....R. J. Lines
Revolving chair.....A. L. Morsell
Riveting machine.....H. C. Pomeroy
Rolling designs upon strips or bars. Apparatus for.....J. & W. D. Eynon
Rolling mill. Electrically driven.....M. Harvey
Rotary engine.....S. Smith
Rotary engine.....I. E. Arthur
Rotary engine.....E. W. Barton
Ruling machine. Engraver's.....F. Wesel
Sad iron waxer.....E. Ludde
Sand blasting apparatus.....M. E. Evans
Scale. Draftsman's.....R. J. Simpson
Scorer. Rind.....W. J. Riddick
Screw driver. Ratchet.....I. E. Stump
Screw press. Power.....H. J. Hinde
Seaming sheet metal bodies. Machine for end.....W. J. Kenny
Sewing machine guide.....I. Stuhlman
Sewing machine lock stitch mechanism.....E. O. Blackwell
Sewing machine take up.....W. C. Free
Shade attachment. Window.....M. F. & C. Stephens
Shaft furnace for burning cement, &c.....J. A. F. C. Seumenicht
Shaft hanger.....C. A. Brinley
Sharpener. Knife.....A. M. McLeran
Shelf and shipping crate. Book.....A. A. Loomis
Ships' hatches. Protective tumbling hood for.....J. Bergesen
Ship's ventilator.....C. McVeety et al
Shirt band stiffener.....A. D. Boudet
Shocks. Appliance for taking up or neutralizing.....F. H. Schule
Shoe duster.....W. G. Mullen
Shoe straining device.....H. Michelstadter et al
Show case.....F. Pollard
Sieve. Flour bolting.....D. I. Coggin
Signal.....W. H. Hartline
Silo.....2 pats. J. W. Woodruff
Sluice. Automatic.....W. B. Skotnicki et al
Smut machine.....2 pats. J. L. Owens
Snap hook.....B. P. Mattison
Soap press.....J. R. Masecar
Spacing device.....G. C. Lees
Sparling plug.....C. A. Mezger
Speed controlling and reversing mechanism.....2 pats. M. C. Johnson
Spelter. Making.....O. Nagel
Spinning machine.....J. G. Fredericks
Spinning roll.....E. Kemshall
Stairway.....F. W. Weber
Starching machine.....S. S. Behrend
Station indicator.....F. C. Luedy
Stay bolt and making same.....G. O. Gruehy
Steam and oil separator.....J. T. Lindstrom
Steam boiler.....C. B. Rearick
Steam boiler.....E. J. Moore
Steam engine.....A. J. Markham
Steam trap.....C. H. Berry
Stencil cutting machine.....S. D. Hartog
Sterilizer.....S. G. Scanlan
Stitch separating machine.....J. B. Hadaway
Stocking supporter.....E. M. Yarrington et al
Storage battery.....H. I. Cogswell
Stove. Combined heating and cooking.....J. L. Van Hook
Stove. Cooking.....B. A. Vaughn
Stoves. Bake oven for gas or gasolene.....R. W. Hilliker
Stoves. Combined gas and air feeding attachment for gas.....J. Dennis, Jr
Submarine construction. System of.....R. H. Weisker
Sugar bearing material. Purifying fluid.....C. A. Spreckels et al
Sugar crystals. Treating.....C. A. Spreckels et al
Sump cooler.....J. Werner
Table.....W. S. Bayne
Tables, &c. Extension slide for.....W. Thompson
Tattooing instrument.....J. Foulitz
Telegraph line repeater.....J. W. Gray
Telephone circuit.....G. E. Goodhead
Telephonic receiver for wireless signal apparatus.....T. Tommasina
Tennis net. Table.....J. Salmon
Threshing machine. Grain.....P. Hofmann
Threshing machine or grain separator band cutter and feeder.....W. Brandon
Tongs. Pipe.....C. F. Bauer
Tool. Convertible.....C. S. Amsden
Tool holder.....C. F. Preston
Tool. Impact.....T. H. Phillips
Toy block.....E. A. Cannon
Toy jack o' lantern.....J. J. Du Ket
Trace.....P. M. Gutleber
Track.....J. B. Quinn
Train order box in connection with semaphores.....I. G. Hoag
Trolley.....P. McCullough
Trolley.....M. P. Crehan
Trolley head or wheel.....G. Aye
Trolley pole controlling attachment.....R. J. Barry
Trolley wheel.....G. E. Chapman et al
Trombone. Slide.....J. Hankey
Truck. Traction.....C. Kilby
Trunk or box safety attachment.....J. T. Collins
Trunk strap.....O. A. Stoneman

Truss. Hernial.....P. Fredin
Tug stop.....O. P. Langan
Turret. Superposed.....T. C. Fenton
Type writer copy holder.....F. E. Grove
Type writer. Electrically printing.....B. A. Brooks
Type writers. Envelop feeding attachment for.....E. H. Reynolds
Type writing machine.....J. Felbel et al
Type writing machine card or sheet holding attachment.....R. J. Fisher et al
Umbrella. Folding.....W. O. Whitney
Undergarment.....F. I. Prue
Universal joint.....H. C. Warren
Uterine packer attachment.....J. E. Fuller
Valve.....J. J. Rylands
Valve and alarm (reissue).....F. Gray
Valve for automatic water heaters.....J. L. Graham
Valve operating mechanism. Washbasin.....E. B. Parsons
Vault light.....L. Braun
Vehicle brake.....E. M. Letts
Vehicle brake.....J. D. Richards
Vehicle curtain attachment.....F. W. Molden
Vehicle. Motor.....W. Norris
Vehicle support. Elastic.....A. Pulbrook
Vehicle wheel.....P. H. White
Vending machine. Cigar.....W. R. Dulemp'e
Vending machine. Match.....G. G. Schroeder
Vessel stopper.....B. C. Cockrell
Wagon and receptacle. Garbage.....C. A. Williams
Wagon. Dumping.....P. Reese
Wagon gear.....G. H. Perry
Wagon gear. Metal.....J. H. Baker
Wagon. Self leveling.....N. W. Thompson
Wagon truck. Steam.....P. H. White
Warp threads. Machine for drawing in.....H. Pardon
Washing machine.....H. A. Robinson
Water bag.....H. H. Upham
Water pipe.....W. Reschke
Water purifying apparatus.....W. C. Clarke
Water tube boiler.....E. G. Rust
Water wheel. Non reverting.....J. T. Moate
Weighing machine.....E. H. McHenry
Well sealing device. Tubular.....C. F. Preslar
Well sinking apparatus. Tubular.....C. F. Preslar
Wheel.....C. L. Horack
Wheel hoist and rest, thimble scrape, nut clutch, &c. Combined.....C. M. Farber
Window.....M. Haberle
Window fastener.....G. E. Mellen
Wire cutter and pliers. Combined.....P. Broadbooks
Wire straining apparatus.....T. Hewton
Wires. Pick up tongs for live.....A. Ambuhl
Wrapping machine.....J. H. Felmlee
Wrench.....A. F. Gwitts
Wrench.....C. C. Longard
Wrenches. Construction of.....F. Searle
Xylophone player.....F. R. Goolman

DESIGNS.

Dresser.....C. M. Kessler
Fringe.....W. T. Smith
Glass receptacle. Cut.....C. V. Helmschmied
Lamp fixture.....T. M. Jamison
Moistener. Stamp or envelop.....M. A. McCray
Pin holder. Hat.....E. Buffum
Rug.....E. H. Bennett
Spoon or fork handle.....F. H. Pretz
Trimming. Dress.....G. S. Hensel
Vehicle body.....3 pats. J. H. MacAlman

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Accounts. System of device for keeping hotel.....J. Willy
Acid and sulfur anhydrid. Making sulfuric.....C. Krauss et al
Acid. Apparatus for making sulfuric.....A. M. G. Sebillo
Adding device.....H. A. Smith
Agricultural utensil.....E. M. Grummt
Air heater.....A. H. Lovejoy
Alloys or compounds of copper and titanium. Producing.....A. J. Rossi
Amalgamating machine.....G. C. Scott
Apartment house.....W. C. James
Automatic switch.....J. A. Tancock et al
Automobile.....C. Cotta
Axle journal box and roller bearing for railway cars.....E. F. Crowther
Azo compounds. Reduction of.....M. Buchner
Badre.....E. B. Wilmarth
Baking cup cleaner.....M. Vautour et al
Balls. Manufacture of playing.....E. Kempshall
Balls. Shell blank for playing.....E. Kemshall
Barber chair strop holder.....J. Roeder
Bark strip cutting machine.....E. L. Brown
Bark strip splitting machine.....E. L. Brown
Barrel. Collapsible.....D. B. Jones
Bearing. Antifriction roller.....H. Howe
Bearing. Axle.....T. F. Van Luven
Bearing cones. Lock for adjustable ball.....A. O. Smith
Bearings. Device for assembling the rollers of roller.....E. F. Crowther
Bee swarm catcher.....E. Stemmler
Beer cases. Combined fastener and corner stay for.....A. Karlson
Belt shifter. Automatic.....R. I. Faucher
Berth guard and ladder.....J. P. Platt
Bicycle.....J. W. Keithley
Bicycle.....H. C. Weeks
Bicycle brake.....A. Main
Binder. Temporary.....E. A. Trussell
Binders. Sheet for serial.....A. O. & E. R. Kittredge
Bit and reamer. Combination.....G. A. Lane
Blast furnace.....F. C. Norcross et al
Block signal system.....L. Riebe
Boat. Canal.....D. H. Wilcox
Boiler tubes or hollow shafting. Stopper for.....H. T. Mason
Bolt lock.....O. Jones
Book. Account.....N. L. Duncan
Book. Note.....A. L. Holton
Book supporter. Revolving.....S. A. Manuel et al
Bottle cleaner.....D. H. Irving
Bottle closure.....J. M. Van Meter
Bottle soaking and washing machine.....C. H. Loew

Bottle. Non-refillable.....D. A. Farrell et al
Bottle stopper.....G. Lisenard
Bowling alley pin setting or resetting device.....Z. D. Butts
Box or chest and table. Combined.....F. L. Mitchell
Brake and power shifting mechanism. Automatic.....J. F. Gail
Brush.....F. Becker
Brush bridle. Paint.....G. C. Traub
Buffing roll.....A. B. Fowler
Burglar alarm.....G. Janke
Burnishing or polishing machine.....O. A. Hanford
Button mold. Collar.....J. S. Barnes
Calender roller.....J. Kleinewefers
Camera. Roll holding.....R. H. Trumbull
Can holder.....L. Funck
Cap vizor and eye shield. Combined.....H. L. Waldron
Car bolster.....W. P. Bettendorf
Car. Convertible.....reissue. J. O'Leary
Car coupling.....J. Timms
Car coupling.....W. F. Richards
Car coupling. Automatic.....J. Darling
Car door.....J. R. Thompson
Car draft attachment. Railway.....M. J. Donovan
Car fender. Street.....C. O. West
Car. Mining.....D. L. Brown
Cars. Friction draft rigging for railway.....J. J. Hennessey et al
Carbonated waters. Manufacture of sterilized.....T. Weyl
Carbureter.....G. C. Diehl et al
Carding machine grinding attachment.....J. Audette
Carpet fastener.....E. H. Humphrey
Cash register.....J. P. Cleal
Cash register.....T. Carroll
Cash register.....A. W. Marr
Casket.....C. N. Johnson
Casting car wheels. Core for.....L. R. Faught
Ceramic products. Manufacture of.....M. Buchner
Chair and cradle. Combined.....A. Nadeau
Charcoal heater.....T. O'Brien
Chemical apparatus.....J. A. Wesener
Chimney cowl or ventilator.....M. Schwartz
Churn.....M. M. Sweetman
Cigar clipper and match lighter.....R. E. Jack
Cigar package.....E. A. Wilcox
Cigarette making machine.....F. Sticker
Clock. Secondary electric.....S. P. Thrasher
Clock striking mechanism.....A. Tomek
Clothes pin. Wire.....L. Lafo et al
Clutch.....M. H. Fischer
Clutch operating mechanism.....H. N. Covell
Cock. Ball.....F. F. Flagg
Coffee berry cleaning apparatus.....W. A. Hastings et al
Coherer.....H. Shoemaker
Coin delivery machine.....A. M. Crothers
Composing tabular matter. Machine for.....M. C. Indahl
Compound or multiple cylinder engine.....I. Kling
Concrete and metal skeleton for building purposes.....O. Ruhl
Condensing system. Steam.....J. D. McRae
Conveyer belt.....J. M. Dodge
Conveyer. Chain.....W. F. Levalley
Conveying apparatus.....C. R. French
Cooling and aerating device.....J. C. Miller
Corset.....L. S. Foerster
Corset.....A. E. Parsons
Cotton gin.....E. B. Lumpkin
Couplings. Yoke and draft bar for.....R. Morris
Cover for tumblers, &c.....F. L. Jobson
Cranberry picker.....C. M. Blydenburgh
Cuff holder.....reissue. W. Thurman
Culinary vessel.....L. Ambler
Cultivator.....M. J. Todd
Cultivator. Lister.....A. Li-gren
Cultivator. Two row.....L. Kirlin
Current collecting or trolley poles. Pivot connection of.....P. McCullough et al
Cutter head bit.....H. A. Pardoe et al
Cycle motor driving apparatus.....H. J. Lawson
Damper.....R. Winter
Dehorning instrument.....J. G. Brown
Delivery mechanism.....G. F. Read
Desk. Cabinet.....R. J. Copeland
Detergents. Making.....G. Bamberg
Distilling apparatus.....2 pats. J. S. Roake
Door guard.....D. C. Meeker
Door hanger.....W. Louden
Door lock. Sliding.....A. Newell
Door operating mechanism.....W. A. Braden et al
Door sealer.....D. J. Matheson
Doors. Operating and latch releasing mechanism for sliding.....W. S. Lincoln
Draft evenner.....E. Burns
Dredge. Hydraulic.....G. L. Cudner
Drier and kiln.....A. E. Dowell et al
Drilling machine.....R. M. Downie
Drilling or like machine.....F. H. Pierpont
Dye and making same. Azo.....C. Schraube et al
Dyes on indigo. Fixing.....E. Lurati
Dynamo or motor brush holding ring.....F. B. Duncan
Edger. Gang.....C. Johnson
Electric alarm.....D. Vial, Fils
Electric battery.....C. Hubert
Electric elevator.....J. Chambers
Electric heater.....W. B. Human
Electric motor and controlling means therefor. Alternating current.....R. Eickemeyer
Electrical apparatus. Means for ventilating cores for.....J. D. Keiley
Electrical outlet box.....H. Krantz
Electrical storms. Apparatus for demonstrating the phenomena of.....G. J. & D. C. Moore
Electrically winding up driving springs. Apparatus for.....H. Aron
Electrode. Arc lamp.....2 pats. R. Hopfelt
Elevator door operating mechanism.....H. Rowntree
Elevator safety appliance.....S. B. Trapp
Elevator signal device.....S. D. Collett
Endless belt feed or carrying apparatus.....B. M. Bishop
Engine reversible device.....R. R. Hage et al
Engine speed regulator. Explosive.....R. A. F. Beilfuss
Envelop or wrapper. Reversible.....W. Masters
Extensible trough.....P. Maginnis
Eyeglasses.....A. B. Critzer
Extension table.....C. W. Munz

Fabrics. Machine for fixing spangled material to textile.....R. Cornely
Fan governor.....H. Koch
Fare register.....A. Nielsen
Fastener for satchels, purses, &c.....A. & J. Hinkel
Feed regulator.....C. B. Moore et al
Feed water filter and heater.....J. Davie
Feed water regulator.....C. M. Spencer
Fence machine. Woven wire.....F. Stebler
Fence post.....O. R. Smith et al
Fence post.....C. Leali
Fence post making machine.....O. R. Smith et al
Fender.....A. Beck
Fertilizer distributor.....W. P. Mize
File and cabinet. Letter.....W. S. Grange
File. Card index.....W. F. Watt
File. Document.....E. G. Waters
Fine fuel furnace.....R. Herzberg
Finger ring. Initial.....F. G. Frey, Jr
Firearm. Revolver.....W. J. Whiting
Fire escape.....J. C. McCombie
Fire extinguisher.....W. H. Banfil
Fire extinguisher.....R. M. Martin
Fire extinguisher. Automatic.....
Fire extinguishing systems. Main valve for.....H. C. Montgomery
Fire extinguishing systems. Main valve for.....H. Eversmann
Fish line reel.....E. D. Rockwell
Fishing reel.....E. vom Hofe
Flexible coupling.....C. L. & R. A. Schultz
Floor boards singly. Instrument for removing.....J. M. Cammack
Fluid operating device.....J. Hartness
Fluid regulating device. 2 pats.....J. Hartness
Fluxing and separating compound.....A. D. Miller
Form. Adjustable sleeve.....M. C. Moran
Fruit juice extractor.....C. Pate
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Furnace.....W. W. Peasley
Fuse box. Multiple.....J. D. Lytle
Fuse cut out. Plural.....C. J. Dorsey
Fuse. Time.....O. Hartmann
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Garment.....J. H. Burt
Garment. Combination.....G. Balduz
Garment hook.....T. D. Richardson
Garment. Nether.....B. M. Crouse
Garment stretcher.....J. H. Youmans
Garment supporter.....W. S. Hunius
Gas burner.....P. Keller et al
Gas burner. Incandescent.....C. W. Taylor
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Gas heater.....E. A. Monjo
Gas impact engine.....L. Wilson
Gas pressure regulator.....D. L. Block
Gas purifier grid.....G. R. Faben, Jr
Gear cutting engine.....F. L. Eberhardt et al
Gear for machine tools. Auxiliary reversing.....H. E. A. Kindermann
Glass annealing leir. Plate.....W. D. Keyes
Glass bottle. Machine for making.....L. Grote
Glass delivering apparatus.....W. D. Keyes
Golf ball.....E. Hempshall
Golf balls. Manufacture of.....2 pats.....E. Kempshall
Grain drill.....C. H. Pelton
Grain drill.....W. Fetzner
Grain preparatory to grinding. Apparatus for treatment of.....G. Bianchini
Graining apparatus.....G. A. Herzog
Grate.....C. T. Coe
Grate front and fender.....J. J. Roll
Grinding knives, principally those of sausage machine, &c. Machine for.....O. Becker
Grinding machine.....M. W. Neuens
Grinding machine work rest.....A. B. Landis
Grinding or crushing head.....V. W. Mason, Jr
Gun. Breech loading.....J. F. Meigs et al
Gun carriage.....K. Deinlein
Guns. Means for securing center pivots to axles in.....G. Ehrhardt
Hand ball.....R. F. Downey
Handle.....W. N. Maynard
Harrow.....J. Macphail
Harvester reel.....C. A. A. Rand
Hat machine.....C. H. Reid
Hat paring machine.....E. S. Alvord
Hay derrick.....G. G. Mayschein
Hay press.....E. W. Moore
Heating apparatus. House.....I. D. Smead
Heating capacity of combustibles. Determining the.....S. W. Parr
Heating system valve device. Steam.....J. A. Serrell
Hinge.....J. MacLean
Hinge.....A. W. Brightwell
Hinge.....S. E. Le Marr
Hinge. Floor.....T. G. Morris
Hoops of tanks, vats, &c. Device for tightening or loosening.....C. L. Parker
Hopple. Horse.....M. Klein
Horseshoe.....A. M. Meisner
Horseshoe calk sharpener.....G. W. Halstead
Hot air furnace.....M. Lee et al
Hub. Wheel.....E. A. Royce
Ice-cream freezer.....E. E. C. Werner
Inhaler with nasal attachment.....G. H. Maurer
Inhaling apparatus. Portable.....J. Planeur et al
Insulator. Electric circuit.....W. J. Walther
Insulator supporting arm.....J. E. Sharpe
Internal combustion engine.....W. J. Robb
Ironing machine.....J. J. O'Shea
Ironing machine. Edge.....H. A. Twigg
Keg.....F. X. Schwab
Kite. Parachute.....U. V. Wyatt
Knife.....E. B. Coughlin
Knob and bell. Combination door.....J. W. Freeman
Knob and bell. Combined door.....J. W. Freeman
Label. Ear.....H. T. Emeis
Labelling machine. Bottle.....N. Muslar
Lace hook and clasp.....H. R. Wilson
Ladder.....J. C. McCombie
Ladder. Sectional.....B. P. Hogan
Lamp. Electric.....C. Hubert
Lamp hanger.....T. Lindsay et al
Lamp. Hydrocarbon.....T. H. Blair
Lamp. Miner's safety.....A. M. Dando et al
Larding pin.....H. Eberts
Ledger. Loose leaf.....J. Barker
Level. Ditching and terracing.....A. Bostrom
Levers. Thumb latch for adjustment.....J. Macphail
Lock.....G. T. Roberts
Loom harness motion.....T. Brindle et al
Loom. Kindergarten.....F. A. Foster

Loom reed.....R. Wilms
Lubricant indicator.....P. C. E. Goetze
Lubricants. Testing.....P. C. E. Goetze
Lubricating hydraulic cylinders. Means for.....L. G. M. West
Mail marking machine.....H. E. Waite
Match machine.....K. Wiessner
Match machine conveyer chain.....E. M. Lockwood, Jr
Match safe.....G. H. Staten
Matrices. Making justified.....A. W. Cathcart
Matrix die mechanism.....A. W. Cathcart
Measurer and register. Log.....E. L. Arthur
Mechanical movement.....F. W. Jaeger
Medical cabinet.....W. S. Rowley et al
Metal cutting, coping, and upsetting machine. Combined shape.....D. Hammond
Metal working machine feeding device.....T. S. Haley
Meta's. Electrically pulverizing.....P. Bary
Metals from ores and scrap containing same. Extracting.....S. S. Sadtler
Microscope.....C. F. Dieckmann
Milk and obtaining same. Modified.....E. von Dugern
Milk can.....O. N. Ahlberg
Milk receptacle lock.....F. Muller
Mining machine.....M. B. Wylie
Mining machine.....H. B. Dierdorff
Mophead.....E. B. Campbell
Moulding animal fiber.....O. P. Amend
Motion. Mechanism for converting.....M. C. Nixon
Motors. Cooling means for rotary.....L. Wilson
Moving heavy bodies. Apparatus for.....C. V. Fowler
Mower. Lawn.....E. H. Clifton
Music box.....G. Otto et al
Musical instrument self playing attachment.....J. Courville
Nail puller.....W. Pearce
Nest. Trap.....W. Schlie
Nitrocellulose and casein compounds. Manufacture of.....C. Bernadac
Nitro compounds. Reduction of.....M. Buchner
Nitro or other compounds. Electrolytic reduction of.....M. Buchner
Nutlock.....W. D. Hughes
Oil burner. Crude.....H. T. Wilson
Oils. Refining.....E. Douillet
Ore separator.....F. R. Waters
Ores. Treating.....A. D. Miller
Ores. Treatment of complex and refractory.....E. Ellershausen
Package carrier.....W. S. Gilmore
Packing machine. Merchandise.....R. L. Patterson
Pail supporter. Milk.....A. J. Morrill et al
Paper bag making appliance.....D. Appel
Paper box.....W. G. Haas
Paper boxes. Adjustable former block for forming.....S. Robinson
Paper folding machine.....H. K. King
Paper making machine.....2 pats.....H. Parker
Paper mill machinery. Blow off nozzle for.....J. H. Baker
Pea shelling machine.....T. Bosshard
Peat briquets. Manufacturing.....E. Helbing
Peat into fuel. Converting.....J. O. Green et al
Pencil. Lead.....D. Dunham et al
Perambulator.....S. P. Withrow
Petroleum motor. Four stroke.....H. A. Bertheau
Photographic roll film.....B. Hausdorf
Piano or organ player. Automatic.....E. L. Watson
Picture exhibitor.....T. T. McGilvary
Picture frame corner support.....J. T. Nelson
Picture frames. Fastener for backings in.....J. L. Tapscott
Picture projecting apparatus.....G. W. Smith
Picture projecting apparatus.....G. W. Smith et al
Piers, &c. Shifting device for.....3 pats.....W. D. Baldwin et al
Pile.....A. A. Raymond
Pill machine.....W. Rabich
Pipe compensator.....K. Schmidt
Pipe grab.....V. Matula
Piston for gas or other motors.....H. E. Ebbs
Pitcher. Syrup.....E. J. Marcotte
Planer or analogous tool. Crank.....H. E. F. L., & E. G. Eberhardt
Planter and cultivator.....J. R. Jones
Planter attachment. Corn.....J. R. Mulder
Planter. Potato.....F. Schumann
Playing ball.....E. Kempshall
Plow attachment.....H. B. Murdock
Plow. Rotary.....J. Scott
Plowshare.....J. L. Sullivan
Pneumatic despatch systems. Sending apparatus for.....R. C. Batchelder
Poke. Animal.....E. H. Pinney et al
Post.....L. A. Pratt
Postmarking and canceling machines. Printing and inking device.....J. French
Power transmission mechanism.....J. Hartness
Power transmitter.....S. Miller
Preserving compound.....S. C. Shoup
Primary battery.....M. M. Bair
Printing press ink distributing device.....J. Thomson
Projectile.....C. C. Bowers
Propeller. Reversible screw.....L. Wilson
Propeller. Screw.....C. A. Parsons
Protractor, square, and pitch board. Combined bevel.....N. D. Hamel
Pulley.....W. Loudon
Pulling over machine.....J. E. Jackson
Pump.....J. Clancy
Pump. Centrifugal.....J. D. McKee
Pump head.....H. M. Etter
Puzzle.....W. B. Smith
Rail bond. Electric.....W. J. Long et al
Railway block signaling system.....W. M. Chapman et al
Railway rail joint.....F. C. Anderson
Railway signal. Electric.....W. D. Vandecar
Railway switch.....E. E. Carneal
Railway system. Electric.....(reissue).....G. L. Campbell
Railways. Electrically propelled vehicle for single rail elevated.....F. B. Behr
Railways. Third rail construction for electric.....C. M. Hobbs
Range finder.....J. Neilson
Record strip feeding mechanism.....J. S. Bancroft
Register.....T. W. Jones
Reversing mechanism.....J. Lizotte
Rheostat and heater. Combined.....M. C. Kruetz
Rheostat operating mechanism. Motor.....J. I. Ayer

Riveting, &c., apparatus. Portable.....P. J. Charles
Riveting mechanism.....J. L. Thomson
Roasting furnace.....F. Klepeiko et al
Rocking chair.....C. M. Wagner
Roll.....J. P. Lange
Roller.....A. P. Knauber et al
Roof cresting. Metallic.....W. F. Norman et al
Rotary engine.....B. D. Hobbs
Rotary engine.....T. J. Perrin
Rotary explosive engine.....S. S. Rose
Rotary motor.....H. Van Beresteyn
Rule and square. Combined.....F. J. Coombs
Ruler, book holder, and marker combined.....T. D. Thomas
Ruling machine.....A. M. Whitten
Sad iron.....C. H. Sheftall
Sad iron and vapor stove. Combined.....J. M. Currier
Sails for marine vessels.....R. Lundquist
Salt shaker granulating attachment.....J. A. Moller, Jr
Sash cord fastener.....P. Barnum
Sash fastener. Storm.....E. C. Kimby
Sash holder.....E. N. Gray
Scale.....C. G. Strub er
Scale. Vertical grain.....P. B. Clarke
Scraper. Road.....T. Wilson
Screw. Temper.....G. F. Bell
Seal lock.....J. R. Thompson
Seal lock.....P. Brown
Seal lock.....H. T. Jones
Sealing device. Envelop.....A. Heydrich
Seam for tin cans. End.....W. Thompson
Seam for tin cans. Solderless end.....W. Thompson
Seam for tin cans. Solderless side. 2 pats.....W. Thompson
Self playing instrument.....E. E. Flora
Separator.....E. C. Statler
Sewing machine. Shoe.....C. K. Keith
Sewing machine spool holder.....J. Bowey et al
Sewing machine. Welt.....E. E. Winkley
Shaft coupling.....A. B. Tower
Sharpening device. Knife.....A. P. Ruhl
Sheet carrying device. Pneumatic.....G. F. Read
Shoe stretcher.....C. L. Passmore
Shutter fastener.....G. P. Rahm
Skate. Combined road and ice.....J. Sakrzewski
Skirt and drawers. Combined.....L. A. Burgard
Sleeve holder.....H. G. Carpenter
Smoke consuming furnace.....C. M. Barnard
Snap hook.....A. J. Townner
Soap. Making.....T. Parziale
Sole rounding machine.....C. F. Cushing
Speed limiting means. Safety.....G. W. Henricks
Spinning.....J. Widmer
Spool blanks. Machine for making.....J. W. Carver
Spool or bobbin.....E. B. Crocker
Spraying device.....I. & J. Zimmermann
Stairway.....G. C. Tillyou
Stamp. Time.....E. B. Hess et al
Starching machine.....E. B. Heindold
Steak tenderer.....W. W. Jacques
Steam generator for locomotive service.....C. H. Fox
Steam generator shells, cylinders, &c. Manufacture of.....B. F. McTear
Stone molding machine. Artificial.....N. F. Palmer
Storage battery.....2 pats.....L. W. Lombard
Stove. Collapsible camp.....F. L. Mitchell
Stovepipe thimble.....S. Bollinger
Strainer. Vegetable.....G. M. Gundel
Stump puller and tree transplant. Combined.....W. A. Hammer
Sugar. Converting cellulose into fermentable.....A. Classen
Sulfur dioxide. Apparatus for generating.....J. D. Moore et al
Talking machine horn tripod support.....L. P. Valiquet
Tank heater.....H. H. Beers et al
Tape holder.....S. Mountford
Telegraphy. Wireless.....H. Shoemaker
Telephone or telegraph system.....E. Shelby
Theatrical appliance.....J. W. Sherman
Thill coupling.....M. L. Herglund et al
Tidal motor.....R. W. Derbyshire
Timber with metal. Machine for covering strips of.....W. P. Appleyard
Time alarm. Electric.....C. Hubert
Tire tightener.....F. Heinz
Tone regulating tool.....F. Hoover
Tools. Apparatus for electrically operating.....C. E. Moore et al
Traction wheel.....J. A. Kenney
Truck bolster.....R. V. Sage
Truck. Car.....E. Cliff
Truck. Car.....B. W. Tucker
Truck. Car.....H. R. Keithley
Trunk.....B. Walsh
Tube cutter.....W. Hervey
Tube expander.....E. L. Knight
Tubes, &c. Machine for making seamless.....B. F. McTear
Tubes with annular corrugations for rendering them flexible. Machine for upsetting.....F. W. Koffler
Tug fastener.....J. Lockwood
Turbine. Steam.....J. H. Fedeler
Type casting or other machines. Record strip feeding mechanism of automatic.....J. S. Bancroft
Type composing machine.....F. Lanston
Type composing machine for tabular matter.....W. Kemp, Jr
Type composing machines. Automatic leader for.....J. S. Bancroft et al
Type justifying machine.....3 pats.....F. McClintock
Type justifying machine.....J. Watson
Type machine pump actuating mechanism.....J. S. Bancroft
Type writing machine.....C. H. Shepard
Type writing machine spacing attachment.....E. V. Beals
Unhitching device for animals, and fire escape and extinguisher. Automatic.....G. P. Neal
Universal joint.....A. A. Pixey
Unloading apparatus. Vessel.....C. H. Woodruff
Valve controlling mechanism for automatic water heaters.....J. Tracy et al
Valve. Flush.....3 pats.....J. J. Finney
Valve. Reducing.....G. W. Lord
Vapor burner. Incandescent.....E. L. Fee
Vehicle.....J. Torrent
Vehicle brake and bell.....S. H. Madsen
Vehicle brake. Automatic.....J. E. Austin

Vehicle. Dumping.....A. Fouts
Vehicle. Dumping.....H. F. Shepherd
Vehicle running gear.....C. M. Spencer
Vehicle wheel.....D. H. Haywood
Vehicle wheel.....3 pats.....G. S. Lee
Vehicle wheel.....D. H. Haywood
Velocipede pedal.....E. W. Henstock
Vending machine.....E. A. Wilcox
Ventilator.....H. M. Smith
Wagon body.....J. H. Finch
Wagon jack.....E. A. Petrie
Wagon tail board fastening.....J. B. Graham
Wardrobe and dresser. Combined folding.....M. J. Randall
Washing machine.....E. O. Hamilton
Watchcase.....E. Bilat
Water heater and steam generator.....C. Nalence
Water purifying apparatus.....A. Harris
Water tube boiler.....J. A. Scott
Weeding implement.....H. Havill
Weighing machine.....E. H. Cook
Well tool. Oil or Artesian.....A. M. Henderson
Wheel.....J. Du Roth
Wheel.....J. Macphail
Wheel or rail tread.....B. C. W. Evans
Wheel tread.....W. J. Judson
Window. Metal.....A. W. Cooper
Window screen. Adjustable.....G. Niehaus
Window screen. Extensible.....W. J. Greenman
Wire coils. Machine for covering.....G. F. & G. M. Wright
Wire stretcher.....J. V. Anderson
Wood. Color shading.....S. Lyon
Woodworking machine chip breaker.....J. R. Thomas
Wrench.....J. D. McFarland, Jr
Wrench.....H. Kintz et al
Writing machine.....E. B. Hess

DESIGNS.

Cabinet for holding coats, umbrellas, &c.....A. A. Holmes
Card plate or holder.....C. S. Brewer
Curtain. Lace.....A. Burgess
Fence. Wire.....J. F. Shelton
Glass dish.....E. J. Koch
Pocket piece or similar article.....G. A. Kruttschmitt

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Advertising device.....H. L. Beach
Air brake connection.....W. Neil
Air brake. Railway car.....F. M. Kreitz
Air cleansing and cooling device.....J. McCreery
Air compressor.....E. Hill
Air diffuser.....S. G. Smith
Air purifying and cooling apparatus. 2 pats.....R. H. Thomas
Amalgamator.....J. S. Marquette et al
Annealing box.....J. J. Markey
Arch. Metal.....R. Gray
Asphaltum. Extracting and refining.....A. F. L. Bell
Atomizer.....C. J. Seltzer
Atomizer air forcing device.....C. J. Walz
Automatic signal.....R. L. Storm
Automobile.....A. L. Kull
Automobile driving mechanism.....A. L. Kull
Awning.....S. Digness
Ax head.....O. King
Axle box and brass. Car.....G. W. Magee
Axle lubricator. Car.....J. E. Gill
Bag handle or carrier.....E. L. & W. H. Cadwell
Bale tie.....H. De Haven
Baling press.....E. W. Hilliard et al
Bandage. 2 pats.....R. W. Johnson
Barrel holding cleats. Apparatus for applying.....F. E. Heining
Basket.....C. P. Litchfield
Battery.....G. S. Bennett
Battery plates. Unting.....W. F. J. Lutz
Bed.....R. A. Bennett
Bed bottom.....J. Hoey
Bed brace.....J. H. Hartman
Bed, Couch.....D. C. Storr
Bed or couch. Interconvertible.....D. C. Storr
Belt.....F. W. Brown
Belt.....L. Hummel
Belt. Harvester.....J. S. Sourek
Bicycle pedal.....W. H. Fauber
Bicycle pump.....E. F. Smith
Billiard table cushion.....M. Bensinger
Blasting purposes. Safety device for.....J. M. Doyle
Blotter. Calendar.....S. M. Dewey
Boat launching apparatus. Life.....J. W. Bedford
Boat. Life.....A. Baumgart
Book cover.....F. C. G. Knibb et al
Book supporter.....E. W. Behrens
Bottle. Non refillable.....D. F. Fitzgerald et al
Bottle. Non refillable.....F. J. Herrington
Bottle. Nursing.....J. J. Minwegen
Bottle running apparatus.....G. Henrtaux
Bottle stopper.....F. Stutz
Bottle washing machine.....H. L. Belknap
Bottles. Device for preventing refilling of.....F. W. Johnson
Box or package.....F. P. Croft
Box plaiting device.....F. H. Fisher
Box shaping machine.....W. S. Smith
Brake block.....J. S. Odgers
Breeding pen for sows.....O. S. Klindworth
Brick press.....C. W. Reynolds
Bricks or blocks. Machine for molding.....C. G. Davies
Bridle bit warming device.....G. Davis
Brine. Vacuum apparatus for boiling.....G. N. Vis
Brooder. Chicken.....S. L. Hirschey
Broom.....F. J. Ellis et al
Brush. Bottle cleaning.....A. A. Pindstoffe
Bucket. Cook.....L. Moore
Buckle belt clamp.....L. Saunders
Buckle. Suspender.....M. Rubin
Buckle. Suspender.....H. H. Wilson
Building.....J. A. Martin-Cooke
Building block.....J. W. Chrisford
Building block.....A. De Man
Bulk head doors. Apparatus for closing or opening water tight.....W. & A. R. Crawford
Bung and tapping bush. Combination.....J. Scior
Burglar alarm.....J. O. A. Cate
Burial device.....R. R. Kinney
Burner.....H. C. Zenke
Butter printing apparatus.....C. A. Hodge
Button.....J. C. Friedrich
Button. Collar or cuff.....O. F. Ambrun
Button making machine.....J. B. Willyerd

Buttons, &c. Mechanism for operating machines for attaching..... T. Long
Cable connection..... C. Luke
Cable connection for covering spliced joints..... C. Luke
Cake pan..... M. A. Grant
Camera, Magazine..... D. A. Lowthine
Can capper..... J. R. Duncan
Can capping machine..... M. Doyle et al
Can testing apparatus..... H. C. Black
Capsule..... G. H. Paine
Capsules, Manufacture of..... G. H. Paine
Car brake mechanism. Railway..... C. W. Powell
Car. Metallic..... H. S. Hart
Car or truck. Transferring..... R. A. Ludlow
Car safety platform. Railway..... J. Holland et al
Car seat..... L. Janson
Car side coupling. Railway..... F. Kohn
Carburetor..... E. R. Inman
Carton..... A. V. Locke
Cartridge. Gun..... W. M. Scruggs
Cash register..... E. H. Jahanz
Cash register..... T. Carney
Cashier and register. Combined mechanical..... I. S. Dement
Caster. Ball..... T. Galvin
Catheter or like instrument..... R. P. McCully
Center iron and lap ring..... P. H. De Rochemont
Charcoal manufacturing apparatus..... C. J. T. Burcey
Chart. Adjustable dress..... J. H. Choquette
Cheese cutter..... W. J. Spillman
Churn and butter worker. Combined..... T. J. Howe
Churn cover..... T. H. B. Van Hoozer
Chute and trap door. Ore..... J. A. Lindall et al
Chute. Coal..... W. H. Simms
Cigarette machine. Continuous..... F. J. Ludington
Circuits. Regulator for alternating current..... C. P. Steinmetz
Cleat. Sheet metal fastening..... F. E. Heinig
Closure..... C. Puddefoot
Cloth finishing machines. Electric alarm for..... J. F. Bannion
Clutch..... D. L. Winters
Clutch. Magnetic..... F. L. Sessions
Clutch. Speed regulating..... H. S. Credlebaugh
Coal, coke, &c. Apparatus for washing..... C. Burnett
Coke. Apparatus for the manufacture of..... P. Naef
Collars, cuffs, &c. Stiffening and making impervious to water starch filled and ironed laundry finished substance of bodies of..... H. A. Mann
Combustion. Fluid for promoting..... T. Battistini
Compound engine..... W. Hopkins
Condiment..... T. L. Healy
Conduit..... T. J. Milner
Corset steel..... A. A. Harvey
Cotton machines. Covered roller for..... O. H. Hathaway et al
Couch frame..... J. Watkins
Coupling and nipple for outlet or junction boxes..... M. F. Whiton
Cover. Cooking utensil..... H. E. Hardy
Cover wrench..... J. B. Erwin
Crate. Dog..... J. C. Porterfield
Crate. Folding..... W. C. Holmes
Crate. Shipping..... W. B. Williams
Cue. Game..... A. J. Gray
Cultivator..... W. J. Wiswall
Cultivator. 6 pats..... J. B. Bartholomew
Curtain fixture..... A. Leach
Curtain stretcher..... C. G. Carlson
Cutter..... F. L. Levy
Cutter guard doffer..... H. E. Irwin
Cutting tool..... S. Welter et al
Davit or boat lowering device. Ship's..... P. C. Johnson
Dental plates. Casting..... W. Streetman
Display device or exhibitor..... I. T. Bell
Distress signal..... T. Coates
Door check and closer..... M. Klingler
Door holder..... D. S. Blaupied
Draft equalizer..... W. C. Dysart
Drawer guard or support..... M. O. Teel
Dress supporter..... M. J. Caruthers
Drill work holding attachment..... G. E. Metcalf
Drilling machinery..... C. E. Willey
Driving mechanism..... O. Woblitzhauser
Drying can or cylinder..... A. A. Hunting
Dye and making same. Black sulfur..... W. Kelbe
Dyeing, &c. Apparatus for..... P. Schirp
Easel..... E. H. Stolz
Electric alarm..... G. M. Peyton
Electric cables. Covering means for joints in..... C. Luke
Electric furnace..... W. R. Parks
Electric furnace..... F. Morani
Electrical apparatus. Means for extinguishing arcs in..... G. W. Partridge
Electrode..... K. A. Wilde
Electrode for electric accumulators..... E. J. Clark
Electrotherapeutic apparatus..... G. W. Euker
Elevator valve mechanism. Hydraulic..... H. F. Witte
Elevator valves. Slow closing device for hydraulic..... L. H. Harriman
Engine muffler. Explosive or other..... A. L. Kull
Engine spray pump. Explosive..... J. T. Metcalfe
Exhaust mechanism..... T. D. Kline
Eyeglasses or spectacles..... W. L. Wall et al
Eyeletting machine..... 3 pats..... P. R. Glass
Fau. Automatic..... M. Ottenheimer
Feeder..... G. M. Hilger
Feeding device. Stock or poultry..... Z. Xevers
File cabinet..... C. F. W. Ahrens
Filter..... C. R. Harris
Firearm locking key..... W. H. Davenport
Fire escape..... J. & P. J. Sethbacken
Fires. Extinguishing..... J. D. Moore et al
Fireproof shutter, door, &c..... J. G. Wilson
Fish hook..... P. B. T. Berner
Fish hook. Expansive..... A. Taylor
Flue cleaner..... J. S. Clarke
Flue cutter..... J. Casner
Fluid pressure regulator..... W. M. Reason
Food cutter..... J. A. Bone
Fruit jar..... F. Mason
Furnace..... F. Sargent
Furnace..... V. E. Edwards
Furnace top. Blast..... P. Meehan
Furnaces. Automatic feed for straw burning..... J. A. Cowan
Furnaces. Feeding mechanism for billet heating..... V. E. Edwards et al
Fuse igniter..... C. K. Jenkins et al
Galvano electric therapeutic chain..... A. Kruger
Game..... J. S. Donovan

Game apparatus..... W. O. Talcott
Game apparatus..... H. Woolfe
Game device..... G. F. Barron
Game or puzzle..... A. J. Selz
Garbage treating apparatus..... R. E. Boschert
Garment..... 2 pats..... I. Davis
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Garment stretcher..... H. A. Brown
Gas burner..... H. Eldridge
Gas burner. Incandescent..... I. B. Taylor
Gas check for Bunsen or similar burners..... F. M. Brooks
Gas generating apparatus..... W. J. Faulkner
Gas generator. Acetylene..... J. Quist et al
Gas generator. Acetylene..... A. C. Einstein
Gas retort. Sectional..... G. F. Richter
Gear. Adjustable speed..... J. D. McFarland, Jr
Gear. Friction..... E. P. Dawson
Gearing. Variable speed..... S. de Ploeg
Golf ball..... 2 pats..... E. Kempshall
Golf club facing..... E. Kempshall
Governor. Marine engine..... J. Levey et al
Governor. Variable speed..... W. J. Still
Grader, scraper, and weeder. Road..... C. Henderson
Grain handling apparatus..... A. Atkinson
Grain separator feeder..... F. J. Wood
Gramophone brake..... E. R. Johnson
Grave marker..... J. A. Delaney
Grinding machine..... J. Gilson
Gun. Breakdown..... W. H. Davenport
Hammer. Automatic valved..... D. S. Waugh
Hammer nail holder..... P. E. McGinty
Hammock..... I. E. P. Mer
Handles or rests to tools. Means for securing..... Z. T. Furbish
Harrow and land roller. Convertible..... H. B. Waltrip
Harvester spring catch tongue saddle..... J. F. Steward
Hat pin retainer..... G. F. Packard
Hat pinning out machine..... C. H. Reid
Hat rest..... G. & J. Edwards
Hay loading apparatus..... T. F. Behrman
Hay rack..... H. P. Vogler
Heater..... J. Dames et al
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Heating apparatus..... J. N. Young
Heating furnace..... H. J. Noyes
Hides or skins. Machine for treating..... F. J. Perkins
Hitching strap. Releasing..... A. Howard et al
Horn rotating mechanism..... I. Frechette
Horseshoe machine..... 2 pats..... G. F. Pilson
Hose pipes, &c. Coupling for..... J. Morris, Jr
Hydrocarbon burner..... J. F. Hardy
Hydrocarbon burner..... G. R. Elliott
Inking apparatus..... H. A. B. Wood
Insole making machine..... A. B. Fowler
Insulated conductor..... E. Thomson et al
Insulator pin..... F. M. Locke
Insulator pin and bracket..... E. T. Bally
Ironing board. Double..... J. M. Gernert et al
Jar closure..... H. J. Winterlich
Jar cover fastener..... J. P. Young
Jar or bottle machine. Fruit..... W. P. Fisher et al
Keyhole guard..... L. Lacroix et al
Kettle alarm. Detachable..... B. Weinberg
Key lock. Changeable combination..... 2 pats..... W. H. Taylor
Keyless pin or bolt..... E. D. Levitt et al
Kite..... H. J. Trainor
Kneeling board..... W. H. Keeran
Knitting machine. Circular..... H. Brinton
Labeling machine..... F. C. H. Strasburger
Lace fastener. Shoe..... L. H. Hancock
Lamp attachment..... L. F. Koester, Jr
Lamp. Electric arc..... J. L. Davies
Lantern..... G. L. Wilson
Last. Darning..... E. D. White
Lasting machine..... M. F. Kelley
Leaves. Device for holding removable..... R. G. Whitlock
Ledger. Loose leaf..... F. Sedgwick
Lens marking or cutting machine..... C. W. Howland
Lifting device..... A. H. Flowers
Lightning arrester and binding post. Combined..... E. E. Yaxley
Lightning arrester for overhead wires..... G. Gola
Line spreader and guide..... T. N. Mathias
Liquid containing vessel..... L. J. Tardy
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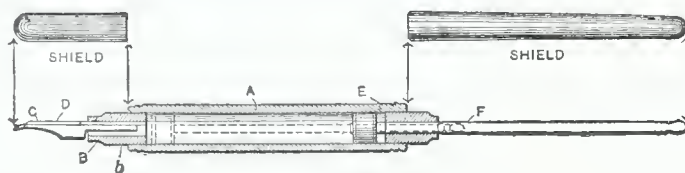
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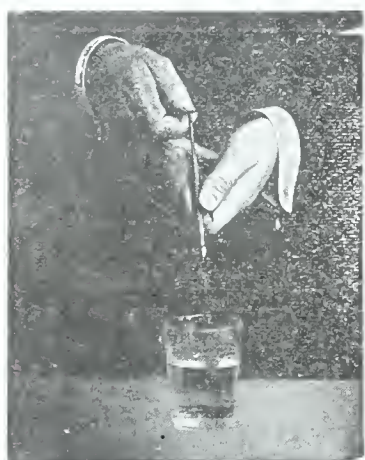
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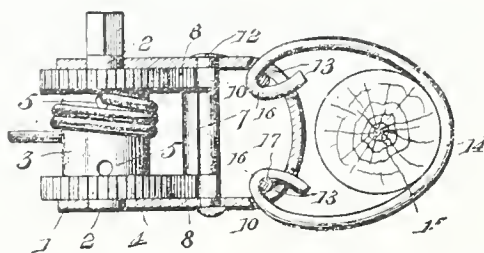
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-- CHAIN BOATS -- ON THE -- RIVER ELBE. --

THE use of a chain for propelling steamers on the River Elbe was inaugurated in 1866, and has proved an economical and successful means of navigating the swift current of that river. Much of the region traversed by the river is skirted by mountains, and as the stream is narrow, the current is necessarily rapid and strong. The first experiment was made for the purpose of towing barges under the bridges with numerous piers at Magdeburg. Now, a chain lies in the channel of the river from Melnick, a point in Bohemia, to Magdeburg, a distance of some 290 miles. At one time, the chain extended to Hamburg, but as the country is flat and the current of the river sluggish below Magdeburg, its use between that city and Hamburg was abandoned in 1898.

The system is controlled by two companies — the Chain Elbe Navigation Company, whose authority extends from Magdeburg to the Bohemian boundary, and the Austrian Northwest Steam Navigation Company, in Bohemia.

These companies own and operate 34 steamers, a few of which are provided with propellers, but most have no means of locomotion except the chain, which they use going up or down stream.

The boats are of symmetrical structure, and by reversing the engines, move up or down stream without turning. They are provided with rudders at either end, operated independently by a pilot wheel located in the center of the boat.

The course of the steamer is not seriously influenced by the chain, and it usually obeys the helm as if it were free. The hull and sides are made of iron, and to meet the rise and fall of the chain, the deck slopes on an incline of about a yard from the center toward each end.

The vessels are provided at each end with deliverers or outriggers, which swing in a semicircle around a pivot by means of rollers on rails, and serve to take up the chain out the water at the bow of the boat and drop it at the stern. The chain runs over the forward outrigger, and over several roller disks until it reaches a steam drum (or drums) located in the center of the boat, which it

encircles three times. It is then carried aft over another set of rollers until it drops into the water. By means of an interposed interchangeable gear, the velocity of rotation is altered according to the course of the vessel up or down stream.

Each of the chain drums consist of four pulleys arranged flush side by side and stiffened by steel bandages between which forged iron ribs are arranged. Within the grooves thus obtained, measuring 3.9 to 4.2 inches in width and about 3.1 inches in depth, runs the chain, obtaining sufficient friction for operation. The driving machinery in the older types of boats consisted generally of twin machines with injector condensation; but the newer vessels are fitted with four-cylinder compound engines with injector or surface condensation. The steam pressure varies between 4 and 10 atmospheres. The boilers contain one or two flame tubes and are provided with return heating tubes.

The original construction of drum has been replaced in a large number of steamers by the chain-gripping wheel.—(See illustration on page 2). This wheel consists of only one driving drum. The chain which was wound three times

around the old drum in order to insure sufficient friction, in this case runs over only about one-half of a drum. It is guided over the ship in the same manner as explained.

On either side of the flanges are provided fingers, four or five of which form a hand. These fingers are provided with springs, which cause the fingers to press against the individual links of the chain. The fingers are also journaled in hands which are guided by means of rollers in such a manner that, in

ascending, the fingers engage the chain links and prevent slipping of the chain. At the point where the chain leaves the drum, the hands and fingers are pushed aside by a guide frame, thereby freeing the chain.

Auxiliary engines for slackening or tightening the tug ropes, handling the anchor, and operating the funnel winches are provided.

As there is only one chain for the up and down travel, the vessels have to leave the chain when passing each other. In such a case, the steamer going down stream, stops, locates what is known as a "lock link," and opens it at the downstream end. To either end of the thus-parted chain, ropes are fastened, and the vessel slowly moves down stream until the rope fastened to the upstream end of the chain reaches the drum. Then the rope is removed and an



auxiliary chain put in its place, which is wound upon the drum—the vessel still proceeding down stream—until the chain reaches the outrigger at the bow. At the same time, the down-stream end of the chain has been dropped by means of the attached rope into the water, and consequently will be found near the stern outrigger, where it is taken up

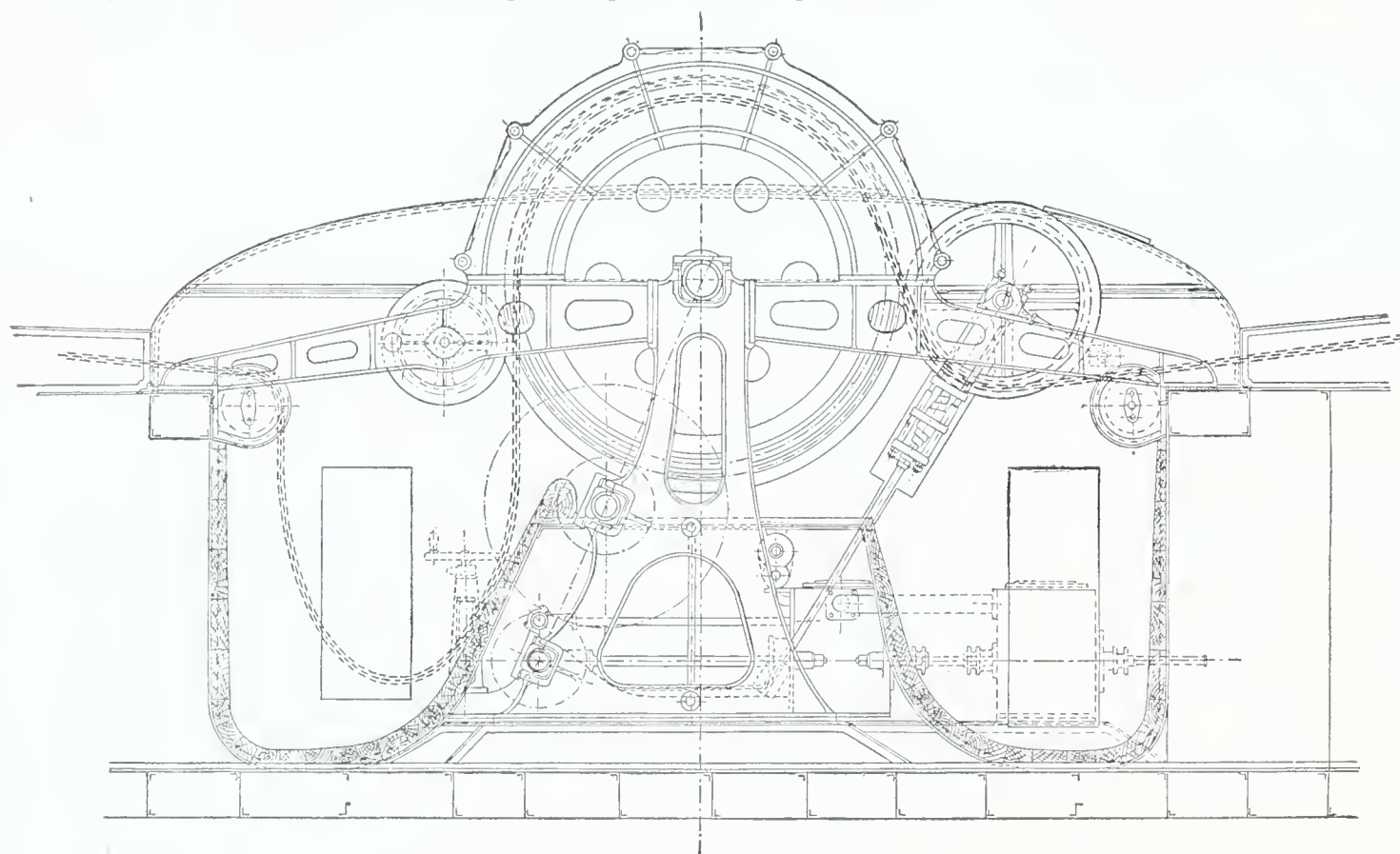
vessels are side by side. Both vessels are now tied together, and the downstream vessel is taken up stream a short distance in order to free the auxiliary chain from the main chain. The upstream vessel slowly proceeds until the lock link reaches the stern outrigger, where it is opened, the downstream end is picked up and a thin rope attached

the length of the loose chain that has accumulated in the rear chain box of the upstream boat, and the latter can now proceed, the downstream vessel following until at first the auxiliary chain and then the main chain have run over the drum. The auxiliary chain is now disconnected, and the end of the main chain is drawn by means

possible to insure the contact of each stylus with a corresponding point of each record by the mere act of placing the stylus on the proper line. Power being applied to rotate the records, identical sounds issue from each of the horns, and the combined body of sound may be made as great as desired by using an appropriate number of records. Therefore, it is possible to provide an exact reproduction of the human voice or to make it louder or softer. Another important point resides in the fact that a record may be made in the natural voice.

The Danger from Lightning.

The United States Weather Bureau has published the results of statistics which it has gathered during the past decade relative to the deaths by lightning in the United States, and while the figures are of doubtful practical utility, they are certainly of considerable interest. The old question used to be how to protect buildings against lightning, —lightning-rods or none, solid rods or hollow rods, and on the latter point, men like Faraday and Sir William Snow Harris took opposite sides and waxed wroth, each telling the other he knew nothing about the subject. Today little or no attention is given to this matter, and it is generally realized that as regards where lightning will strike we must all take our chances, which, according to the statistics referred to, are about 1 in 100,000 of being struck. The old idea that lightning will never strike twice in the same place has been pretty well exploded by the actual facts, and there is reason to assume that if lightning strikes a given point once it may be expected to strike there again, rather than at some other contiguous place. The theory of lightning is now fairly well established. It is supposed to be due to the rapid condensation of the minute drops of moisture in the air, each of which, under certain conditions, contains a small electric charge. As these minute drops coalesce, the electric potential is increased, due to the fact that the total superficial area of the coalesced drops is less than twice that when they existed singly, and, as the electric capacity is proportional to this area, the electric charge of the two drops is now confined within an area of less capacity than before, with the result that the electric pressure is increased. In this way, long before the drops have attained a size to be precipitated as rain, an electromotive force amounting to millions of volts is developed. While there is no certain immunity from lightning when it prevails, attention is called to the great desirability of persevering in efforts to resuscitate those who have been rendered insensible by lightning strokes, as recoveries have repeatedly been made of persons supposed to be dead, after more than an hour's efforts. The statistics also show that there is no immunity from lightning in a feather bed, in a house, or in a closet, and that knives and the like do not attract lightning. For those who are inherently dreadful of lightning the only comforting suggestion that can be offered is to remember that if one lives to see the flash he is safe for that time! —*Cassier's Magazine.*



and connected again with the forward-chain end, after the auxiliary chain has been removed by replacing the lock link. Before the reconnected chain is dropped again into the water, the steamer anchors itself by means of a small auxiliary chain to the main chain, to prevent its drifting down the river. A signal is now given to the up-stream vessel, informing it that everything is ready, and it advances until both

to it. It is now taken over to the rear outrigger of the down vessel and there secured by means of a catch. This steamer now is allowed to drift until its forward outrigger comes alongside the stern outrigger of the upgoing vessel. The auxiliary chain of the down boat is now taken in through the rear outrigger of the up vessel, and is connected again to the front end of the main chain. The down vessel drifts

of the rope through the rear chain groove up to the rear outrigger, and there connected by the lock link to the other main chain end.

The two steamers have now passed each other, and, both being on the main chain, can continue on their way. The whole operation takes between fifteen and thirty minutes.

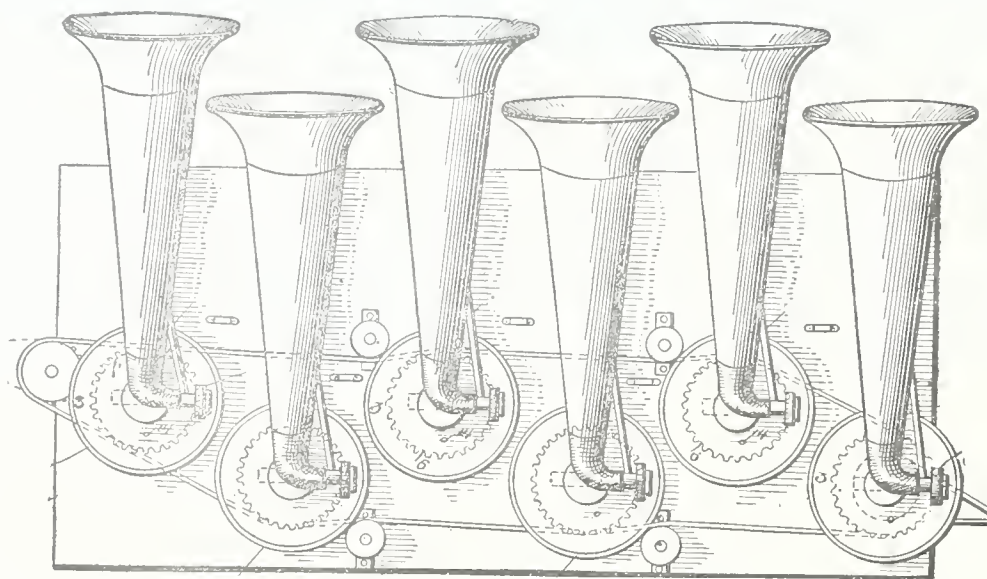
The speed up stream on the chain averages 2.5 to 3.1 miles per hour, and down stream 6.2 to 7.5 miles per hour.

A MULTIPLE GRAMOPHONE.

Much of the strained and unnatural quality of sounds reproduced by the ordinary gramophone, especially in the case of the human voice, is due to the fact that in order to make the reproduction as loud as possible, the original must be the result of abnormal effort. This has been remedied by a device described in the *Electrical Review*, due to Emile Berliner, of Washington, the well known inventor.

He provides a machine made up of a number of separate gramophones, all of which may be operated simultaneously. As is well known, gramophone records are exact duplicates of each other even to the minutest detail, and as such are made in large numbers. The only difficulty to be overcome in operating several is to have them exactly register with each other and be operated simultaneously. He provides a table or support upon which are mounted a number of rotary tables of the usual gramophone type and adapted to receive the well known record tablets of commerce. These tablets are generally arranged in a staggered row, each being supported on an upright spindle or shaft journaled in a standard fastened to the

table. Upon each shaft just below the table is secured a disk having equally spaced radially projecting pins on its periphery. The disks are all of the same size, with the same number of pins, and they are driven together with the tables at the same speed by means of a belt, having per-



forations spaced to fit the pins and operated by a motor of any desirable construction, suitable idlers being employed to keep the belt tight. The amplifier horns are of the ordinary construction, as are also the reproducer heads which coact with the

tablets. In order to insure each record being placed in the same relative position on its table, the records are provided with orifices or seats, the seats and each identical record of a set being of the same relative position on the record. The tables have upwardly projecting pins which register

with the orifices. This is only one way in which the several records may be brought into proper relation. In operation the records are placed on their tables or supports as described, and the reproducing styluses are brought down on the first lines. The registering devices, therefore, make it

INVENTION OR MECHANICAL SKILL?

A Problem Perplexing to Patent Office Officials and the Courts.

By W. F. WOOLARD,
First Assistant Examiner, Textile Division
UNITED STATES PATENT OFFICE.

THE question as to whether any particular device involves in its original production an exercise of the inventive faculty or nothing more than mechanical skill, such as is to be expected of the artisan working at his trade, is one which cannot be determined by any definite rule. To be within the contemplation of and be entitled to protection by the patent laws, the courts have insisted that every improvement or new device must embody some degree of invention, be, that degree ever so slight, and in very many cases, patents covering meritorious devices and constructions of utility have been declared to be invalid, for the reason that their production involved only what was thought to be mechanical skill and lacked invention altogether.

It is invention which produces devices not known before, but improvements on such devices may be due either to an act of invention or the exercise of mechanical skill. A workman directing the movements of a machine committed to his superintendence discovers an imperfect or unsatisfactory operation, with probably a resulting product not possessing the degree of perfection which is to be desired. This exigency, due to conditions short of perfection may arise in any class of devices. The workman realizes the deficiencies of the old appliances, but no betterment of the conditions is possible without effort on his part. How is the difficulty to be met? Improvements arise from an appreciation of the needs or desirability of a better construction, the old law that "necessity is the mother of invention," being applicable to improvements. A study of the parts, and there dawns in the mind of the workman a conception of an improvement in the construction which he believes will render the machine better adapted for the performance of the desired work. This conception of a change in the form of the device is reduced to practice by making the part, and applying it to the machine in substitution for that part which it is designed to supercede. In any aspect in which the new part may be viewed, it will be regarded as an improvement of the old one by reason of the facilitation of the work of the machine.

Now arises the question, in applying the patent law, as to whether the improvement is an "invention" in the sense contemplated. The field of "invention" is a broad and open one, and it is a comparatively easy matter to distinguish a true invention, for such carries with it the unmistakable proofs of the fact which can be detected at a glance. But the difficulty arises when one, having an improvement of less degree and in which proofs of the fact of invention are lacking, in endeavoring to reach the open, passes first into that hazy borderland of "Mechanical Skill" which so closely surrounds the broader field.

The Supreme Court of the United States in the case of *McClain v. Ort-mayer*, 141 United States Reports, speaking of "invention," said:—

"The truth is, the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves the exercise of the inventive faculty or not. In a given case, we may be able to say that there is present invention of a very high order. In another, we can see that there is lacking that impalpable something which distinguishes

invention from simple mechanical skill. Courts, adopting fixed principles as a guide, have by a process of exclusion, determined that certain variations in old devices do or do not involve invention; but whether the variation relied upon in a particular case, is anything more than ordinary mechanical skill, is a question which cannot be answered by applying the test of any general definition."

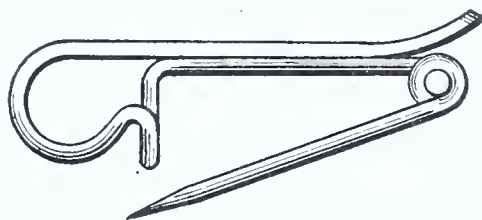
In *Atlantic Works v. Brady*, 107 U. S., the same Court said: "To grant to a single party a monopoly of every slight advance made, except where the exercise of invention somewhat above ordinary mechanical or engineering skill is distinctly shown, is unjust in principle, and injurious in its consequences. The design of the patent laws is to reward those who make some substantial discovery or invention which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favor."

A leading case involving the question is that of *Flood v. Hicks*, 2 Bissell. Wagons with a curved pole connecting the front and rear wheels were old, when the patentee arched the pole sufficiently to allow the fore wheels to turn under the pole. The change was held not to involve invention; that, given the curved pole in the first instance, it was within the skill of the mechanic to increase the curve to the extent necessary to attain the result desired.

It was an old idea in constructing printing presses so as to deliver the printed sheets by either fliers or tapes, or to combine these features and secure delivery. Likewise, it was old to build such a press having an impression cylinder, without tapes, a receiving cylinder with grippers and tapes, and a tape delivery. The Supreme Court in *Hoe v. Cottrell*, 18 O. G., held that it involved something more than mechanical skill to add to the combination a flier, and sustained the patent.

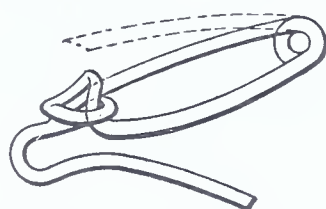
In the case of *Merritt v. Middleton*, 68 O. G., the device in suit was a pin hook for attachment to a garment to hold a pair of eye-glasses.

Patented Device



The device was formed out of a single piece of wire, and was held by the Court to involve in its production, only most ordinary mechanical skill, in view of the pin hook shown by a prior patent, likewise made of a single piece of wire.

Anticipating Device



In *Dederick v. Cassell*, 20 O. G., a baling press was in suit. The Court admitted the contention that the features of the improved construction were old in other relations, but denied the plea that only the skill of the mechanic was

employed to select and combine the parts and produce the new press.

Up to 1873, type figures had been cast on N-bodies, but in that year a patent was issued for a new system of type casting whereby the figures were cast two-thirds the width of the body, and the printing faces enlarged. It was held that this invention involved something beyond mechanical skill, and the patent was declared valid.—*Bruce v. Marder*, 22 O. G.

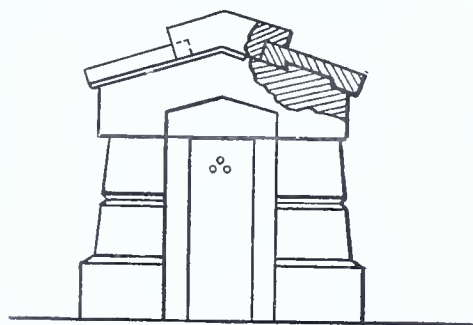
Tips for the insoles of boots and shoes were previously made of leather pressed into shape, and also of vulcanized rubber alone or mixed with other materials and suitably molded. In *Shutter v. Davis*, 24 O. G., the court sustained a patent for a tip made of muslin or similar textile material stiffened with shellac, holding that the latter embodied invention and was not an obvious thing to those skilled in the art.

In *King v. Trostel*, 25 O. G., the patent covered a bale of plasterer's hair consisting of several small packages, each containing a predetermined quantity of hair, whereby handling of the hair, which before that time was in bulk, was avoided. It was held by the Supreme Court that the arrangement stated involved only the ordinary skill possessed by any person.

It was held in *Corbin Lock Company v. Eagle Lock Company*, 65 O. G., that mechanical skill only is involved in routing the recess for a lock having a rounded front edge, instead of, as formerly, cutting such recess with a chisel to receive a straight edged lock, and that such differences do not rise to the dignity of invention.

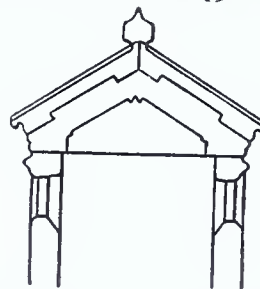
In *French v. Carter*, 53 O. G., the patent in suit was for a vault roof composed of two inclined roof stones and a cap stone.

Patented Vault



The construction was held by the Supreme Court to involve merely mechanical skill over an older arrangement, in which there were two inclined roof stones surmounted by a ridge stone, the latter being the equivalent of the cap stone.

Anticipating Vault



The Court in *Hien v. Buhoup*, 81 O. G., held that to change the form of a coupling pin having a round shank with a button head to that of a square shanked pin having an oblong head to overcome a defect in the operation, was simply a variation in construction "by mere mechanical skill, without the exercise of the faculty of invention."

Many valuable improvements in the construction of machines are made by alert workmen, who modestly disclaim having produced any device of merit when invention is suggested, and who regard these manifestations of their skill as only the natural result which follows an understanding of the needs of the machines they superintend.

There are in daily use in the arts unpatented machines representing a high degree of perfection, and which in de-

tails of construction, are wholly unlike the original patented machines, these unpatented machines being the product of evolution through successive stages of improvement due entirely to the mechanical skill possessed by the workmen, who have brought about the transformation gradually by replacing a part at a time until the present perfected machines were built. No single step of the improvements would embody any patentable invention; nor would the machine as a whole embody anything patentable, because of other conditions.

It has been held in some cases that mechanical skill and not invention is shown by the fact that several persons unknown to the inventor, and to each other, and without knowledge of the patent did construct the same device, while in another case, somewhat analogous, it was held that invention was established by the fact that several persons, each working independently and unknown to the others, had produced the simple device.

Judge Grosscup in the case of *Gindorff v. Geering*, 80 O. G., upheld a claim for a chuck, and devices for serrating the sections of a sickle, the novelty of the same not being denied, on the ground that something more than mechanical skill was involved in what was seemingly a duplication of a part. In deciding the case, he said: "If this chuck were obvious to mechanical skill, why had not such skill, already called upon, supplied the need before? I fear that under these circumstances, were I to hold it a mere mechanical adaptation, I would be considering myself a wiser and better mechanic than those who for years have overlooked this method of accomplishing a desirable result."

Many patents have been granted where the degree of invention is small, and some of these patents have had somewhat of a tempestuous career. Invention may be conceded by the Patent Office, only to be attacked later in the Courts, as shown by the large number of patents in suits involving the question of mechanical skill. In every case in which the question is raised, the peculiar facts attending that particular case must be relied upon in determining the question. Each case stands apart from any other and it is to be considered on its own merits. The highest tribunal of the country does not formulate any rule or line of demarkation, and it would appear that the long standing contest between invention and mechanical skill is to continue indefinitely. If viewed favorably by the Patent Office in the first instance, the invention may be unchallenged for the statutory term of years, for only a small percentage of the patents granted are reviewed by the courts.

Removing Nicotine From Tobacco.

A number of processes have been devised for removing from tobacco its harmful ingredients, especially the nicotine; but the trouble is that the residue is generally not only harmless, but insipid. A party named Gerold, of Halle, Germany, claims to have succeeded in neutralizing the injurious principles of tobacco without taking from it the flavor so much prized by smokers. The method is as follows:

The leaves are treated with a solution of tannic acid, which has the property of fixing alkaloids so that the nicotine and the essences contained in the plant, such as nicotianin, etc., are neutralized, and rendered inoffensive. It would appear that this operation does not cause the tobacco to lose its flavor. To renew the perfume dear to the smoker, which is injured by the tannin, the tobacco is then soaked in a prepared decoction of wild marjoram. These cigars are now sold in America, Germany and Russia, and are, it appears, much liked by smokers, while they are recommended by physicians.

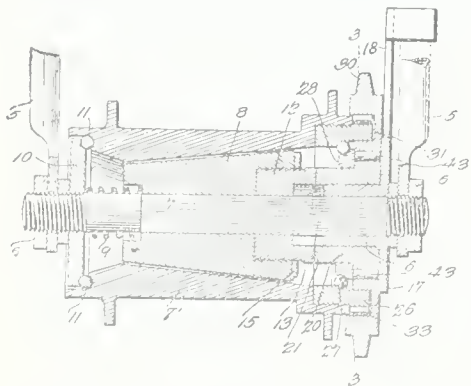
CLEVER NEW PATENTS.

Bicycle Brake.—Box Hinging Machine.—Weather-Strip.—Setting Tool.

Bicycle Brake.

Mr. Alfred Doney, of Pen Argyl, Pennsylvania, has made some very important improvements in the class of back-pedaling brakes for bicycles, one of which was described in the INVENTIVE AGE for October, 1899. Recently Mr. Doney obtained a patent on a new idea in this line which is constructed as shown in the accompanying cut.

Figures 5, 5, designates a portion of the rear forks of a bicycle frame, to which is secured by suitable nuts 6, the threaded ends of the rear axle 7. This axle, for the greater portion of its length, is polygonal in cross-section and supports a conical friction-block 8, formed of fiber or equivalent material and adapted for frictional braking-contact with the tapering inner surface of the rear-wheel hub 8, but normally held out of contact therewith by a coiled compression-spring 9, extending between the smaller end of the brake-block, and a disk 10, secured to the threaded end of the shaft and provided on its periphery with a ball-race for the support of bearing-balls 11. The larger end of the brake-block 8, is provided with a threaded orifice for the reception of a threaded collar 12, adapted to slide with the brake-block upon the shaft, and provided at its outer end with a double cam-face 13. The collar 12, may be removed, together with the brake-block, from the squared portion of the shaft and adjusted to any desired position within the block in order to provide for the taking up of the wear of the friction-block, and a

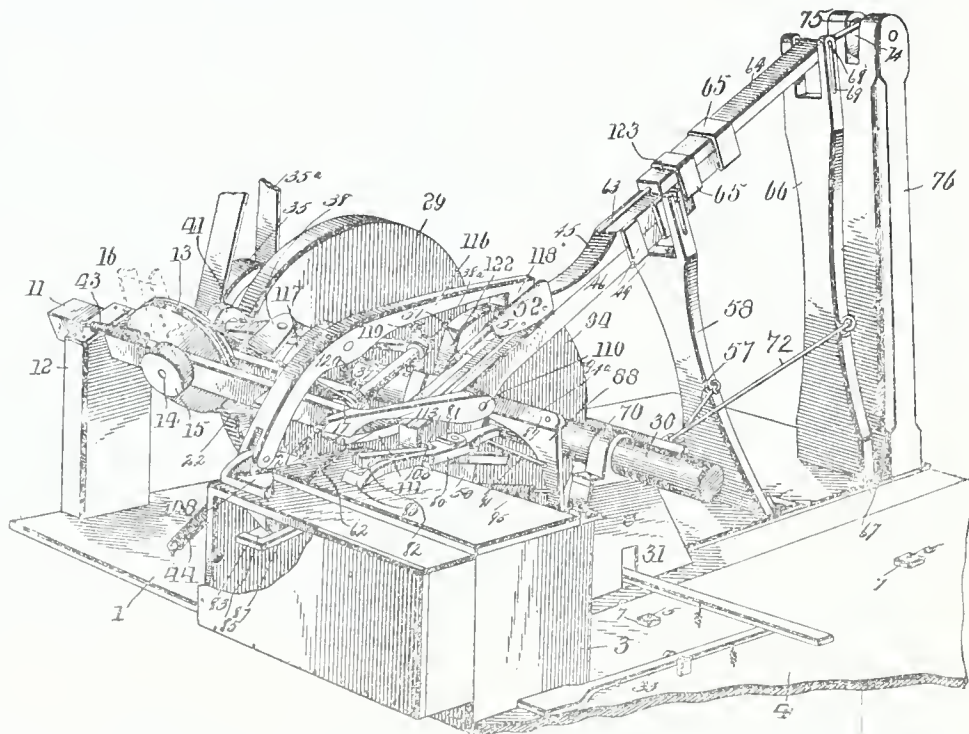


nut 15, locks the parts in any adjusted position, although this is not necessary when the parts have been adjusted and are to be immediately replaced, as both are provided with openings corresponding to the contour of the shaft 7, and are incapable of independent rotative movement when in position on said shaft.

The shaft is locked against rotation by a collar 16, having a circular peripheral portion, and provided with a squared orifice for the reception of the shaft. At the outer end of the collar is an annular flange 17, from which extends an arm 18, having locking-ears adapted to engage the opposite sides of one of the forks of the rear frame. On the peripheral portion of the collar 16, is mounted a revoluble collar 20, having at its inner end two cam-faces 21, adapted for operative contact with the mating cam-faces 13 on the collar 12, and when the collar 20, is revolved in a direction opposite to the normal direction of travel of the rear-wheel hub, these cam-faces will operate to move the brake-block 8, in the direction of the spring 9. When the rider stops pedaling, the chain and sprocket-wheel will stop, but the hub will continue to rotate freely, permitting the rider to coast. When it is desired to apply the brake, the pedals are turned slightly in a reverse direction, causing the immediate engagement of the clutching mechanism between the sprocket-wheel

Box Hinging Machine.

In order to cheapen the construction of that class of boxes having hinged covers, Mr. Dan L. Hill, of Keene, N. H., has invented and patented an ingenious machine which mechanically performs all the operations, without the necessity of any hand labor, other than an operator who superintends the general running of the machine. That is to say, the machine provides for the drilling of the holes through the lid and the box for the reception of the hinge, the insertion of the hinge within the holes thus provided, the bending down of the free ends of the hinge

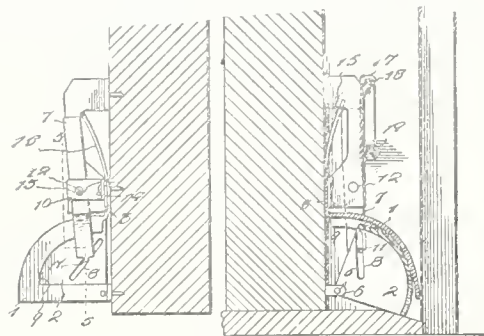


members, the forcing of these through the lid and the box, respectively, and the upsetting or clenching of the ends of the said members in the order named. In the first place, the hinges and the manner of securing them, are well worthy of attention. They each consist of staple-shaped wires that are pivotally inter-locked and are passed diagonally through the adjacent edges of the boards to be hinged together. The free ends of these wires are passed through the boards and bent over so that they cannot possibly

and the collar 20. This movement causes the cams 21, and 13, to co-act, producing a longitudinal movement of the brake-block in the direction of the spring 9, and bringing the periphery of the block into contact with the inner surface of the hub. The friction exerted is at all times absolutely under the control of the rider, and may be applied very gradually, if desired, in order to slowly stop the machine.

Weather-Strip.

A very useful invention is a weather-strip patented by Mr. Benjamin F. Higgins, of Shattuc, Illinois, designed



to prevent the ingress of air, dust, and moisture beneath the door when it is closed. He constructs a metallic cas-

be pulled out. The general arrangement of the machine is shown in the accompanying cut, which is a reproduction of one of the Patent Office drawings. The box and cover are shown at 3, being clamped in place upon the machine. An opening for the reception of the hinge is first drilled through the lid and through the box by means of a bit shown at 21, this bit being driven by suitable mechanism. After the hole has been made, the drilling mechanism automatically moves to one side, and a hinge is then brought opposite the openings thus made. A follower or plunger shown

at 51, forces the blank into the openings, after which the ends are bent at substantially right angles by means of pivotally connected levers 82, and 83. These bent ends are then forced respectively through the lid and through the box, after which they are clinched to prevent their withdrawal. On a cursory glance at the cut, the mechanism may seem rather intricate, but a close examination will clearly show that the machine is made up of comparatively few parts which are simple and not liable to get out of order. The production of this machine reflects great credit on the inventor, as it fills a long felt want.

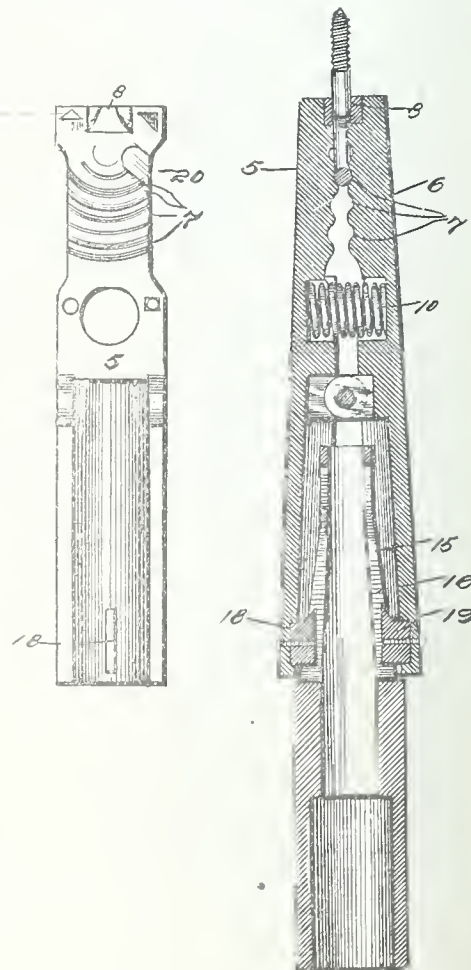
ing which is attached to the lower edge of the door, and within the same is pivoted the weather strip which is also formed of metal and is substantially a quadrant in cross section. An up-right lever is fulcrumed between its ends on the exterior of the door, and has its lower arm arranged at one end of the casing and extended into the same, being connected with the weather strip. The upper end of the lever has an offset finger that is normally held away from the door by means of a flat spring, this finger being arranged to engage the stop fastened on the door frame. Therefore, when the door is closed, the lever will be operated, consequently throwing the weather strip downwardly and closing the crack beneath the door. When the door is opened, the spring actuates the lever in an opposite direction, thereby moving the weather strip up into the casing so that it will be raised above the floor and out of the way.

Setting Tool.

A very handy tool in the form of an instrument for setting screw-eyes, hooks, tacks, and the like in ceilings, walls and other places inconvenient to reach has been patented by Mr. James

Kydd, of McPherson, Kansas. The device comprises two jaws 5, and 6, which are pivotally connected at points intermediate of their ends, whereby when the jaws at one end are opened they will be closed at the opposite end. The inner faces of the gripping portions of the jaws are provided with arcuate grooves 7, which are adapted to receive the curved portions of screw-eyes, screw-hooks, and other similar devices that may thus be held most securely. In the ends of the gripping portions of the jaws are formed longitudinal grooves 8, which engage over the stem of the article held. When a screw-eye is held in the jaws, the head enters corresponding grooves in the inner faces of the jaws, and the screw-eye is thus held securely. The jaws are held normally and yieldably, with their gripping portions separated by a helical spring 10, which is disposed in recesses in the inner faces of the gripping portions of the jaws and adjacent to the pivotal connection thereof.

To force the opposite ends of the jaws apart, so that the gripping portions will be brought together, a wedge 15, is provided, the inner faces of the jaws being concaved to receive the wedge, and through this wedge is formed a slot 16, passing diametrically thereof and opening into the cylindrical bore of the wedge. To limit the sliding movement of the wedge into and out of wedging position, stop-blocks 18, and 19, are attached to the inner faces of the jaws and lie in the slot 16, so that when the wedge is pressed inwardly these blocks strike against one end of the slot, and when the wedge is drawn outwardly the blocks strike against the opposite end of the slot.



When a screw-eye is to be set, it is placed between the gripping portions of the jaws, and the wedge is pressed inwardly to cause the jaws to grip the eye, said eye lying in the grooves of the jaws corresponding to the position of the eye and the diameter thereof, it being noted that the arcuate grooves are of different radii, the grooves of least radii being nearest to the outer ends of the jaws. The tool is then raised by its handle and pressed with the stem of the screw-eye into the wood or other material, into which the screw is to be engaged, and the handle is turned to screw the eye home.

A DUTCH WINDMILL.

THROUGHOUT a great part of the arid and semi-arid region there are localities where water can be obtained at a short distance from the surface. The amount, although not large in the aggregate when compared with the quantity in some notable stream or lake, is yet inexhaustible by the ordinary methods of pumping. If, therefore, this water which exists from 10 to 50 feet beneath the surface can be cheaply raised, it will be practicable to utilize it for agriculture tracts which otherwise have little or no value.

The irrigation of 20 acres in the midst of a section or township of land is, figuratively speaking, a mere drop in the bucket; but the reclamation of this small area generally means the utilization of adjoining lands. If, for example, 20 acres of some forage crop like alfalfa is made possible, this will result in obtaining a considerable amount of winter feed used in the sus-

the Great Plains region, is the wind, which blows almost continuously. It carries the dust before it, cuts out the traveled roads, carries away the fine earth of the tilled fields, and builds up a fine loess, almost everywhere to be found. The wind, which has so long been considered as an annoyance and mischief-maker, has sufficient strength to perform the work of bringing water to the surface, if only suitable means of directing its energy can be discovered.

The windmill is the best-known method of converting wind energy into work. In one form or another it has been used from time antedating the dark ages. In the twelfth century, windmills, built either by individuals or by communities, were common. Some of these mills were of enormous size. In the German type the whole building on which the mill was placed was constructed in such a manner as to turn on a post in order to bring the sails into the wind. In the Dutch form the building was fixed, but the head of the

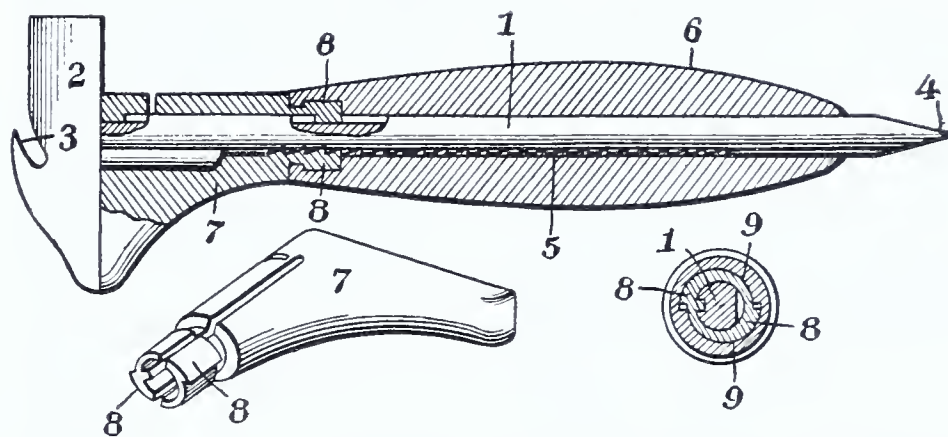
windmill does not look like an American product—and it isn't. It's an importation from Holland. There is no patent on it. Anyone can make a windmill like this one if he chooses, but most of us would prefer to purchase the graceful, practicable, serviceable mill, such as may be seen in abundance throughout the west, with its self-governor, self-lubricator, etc. As a freak production the Dutch windmill is worth more than passing notice. From the standpoint of mechanics, it would be considered a failure. It is a reminder of the times when hand work was employed to do everything from plowing with sticks to harvesting with the cradle. The advance that has been made in the mechanical arts is clearly shown by this one illustration alone.

VALUABLE PATENT FOR SALE.

For many years past, the aim of a vast army of inventors has been to combine a plurality of independent tools in a single implement, the result of which is a heterogeneous collection of nondescript implements of questionable utility. The fault with nearly every implement of this character has been that too many tools have been assembled in a single device, and the arrangement thereof has been faulty,

restricted use of any one of the tools without interference by any of the other tools.

As shown in the accompanying cut, the device is made up of a metallic stem or shank 1, having one end provided with an integral head 2, which forms a hammer-head and a movable wrench-jaw, and is provided at an intermediate point with a claw 3, the opposite end of the shank being shaped to form a screw-driver 4. One side of the shank is provided with ratchet-teeth 5, and a wooden handle or hand grip 6, loosely embraces the shank and is terminated short of the jaw 2. A substantially L-shaped stationary jaw 7, is located between the handle 6, and the jaw 2, and has one member made tubular to receive the stem or shank 1, and also split so as to be yieldable or elastic. The extremity of the tubular member is reduced and swiveled within a socket in the inner end of the handle, and is also provided with opposite cam surfaces 8, which cooperate with corresponding cam surfaces 9, within the socket, so that by turning the handle in one direction, the split jaw member may be gripped upon the tooth portion of the stem to hold the movable jaw 2 in any adjusted position with respect to the jaw 7, and by turning the handle a quarter rotation in the opposite direction, the shank will



thereby rendering the device awkward and impracticable to such an extent that it has failed to command a market.

In marked contrast to the heretofore unsuccessful attempts, is the recent invention of Mr. A. C. McFarland, who has produced an exceedingly novel and highly useful form of implement in which a claw-hammer, a wrench and a screw-driver have been combined in an ingenious manner to protect the adjusting parts of the wrench, and at the same time to permit free and un-

be released so as to permit of a quick adjustment of the movable jaw. This construction provides a handy tool for the use of the farmer, teamster or mechanic. It can be adjusted while wearing gloves as easily as when bare handed. It combines several tools in one, and can be sold at the same price that one would ordinarily pay for a single implement.

Further information concerning this device can be had of the inventor, Mr. A. C. McFarland, who resides at 2902 East Colfax Ave., Denver, Colorado.



DUTCH WINDMILL AT LAWRENCE, KANSAS.

tenance of a herd which can be pastured upon the surrounding dry land. The successful cultivation of this 20 acres may thus directly or indirectly support a family, and, with increased experience and adaptation to the surrounding conditions, the family may in turn give place to a rural community. Given the existence of sufficient water underground to irrigate the 20 acres, the first question is that of ways and means of bringing the water to the surface.

The force which is ever present, making itself persistently felt throughout

mill could be turned into the wind. The most notable use of these early mills was in Holland, where the land was drained by pumping water from behind the dikes into the sea. In 1391 the Bishop of Utrecht, holding that the wind of the whole province belonged exclusively to him, gave to the convent at Windheim express permission to build a windmill wherever it was thought proper. In so doing he overruled a neighboring lord, who declared that the wind in the district belonged to him. Three years later the city of Haarlem obtained leave from Albert, Count Palatine of the Rhine, to build a windmill, using the wind of the country.

The accompanying illustration of a

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Siggers, Patent Lawyer, Washington, D. C.

Nelson H. Sturgis, Guthrie, Oklahoma Terr. Suspension Bridge.—The patent recently issued to Mr. Sturgis, is of special interest to bridge builders, as it discloses the latest development in the construction of suspension bridges. Mr. Sturgis is a practical engineer, and his advanced ideas have been incorporated in the construction of a number of bridges recently built in Oklahoma Territory. His latest improvements relate to the construction of the arch and the anchoring devices for the shore ends of the cables, the primary object in view being to secure simplicity of construction and great strength. The patent also discloses novel means for positioning the hanger rods on the cables, for connecting the hanger rods to the needle beams, novel connections for the vertical and diagonal braces, wind braces resisting the lateral vibration of the bridge, and a causeway for foot passengers, formed by the extension of the needle beams.

William O. Whitney, Glens Falls, N. Y. Two patents. Centrifugal Propeller and Folding Umbrella.—The marine propeller comprises a hub, and a series of blades each having the form of a cone section, the object being to effect the generation of a maximum of energy by a minimum expenditure of power. The device has been subjected to practical tests, and is found to be highly efficient, both when acted upon by a fluid, as for instance in the operation of wind mills, turbines, engines or the like, or when utilized to act upon a fluid, as for instance in the propulsion of vessels.

The folding umbrella, disclosed in Mr. Whitney's other patent, is remarkable for its simplicity and durability. When in use it is of the standard size and has the appearance of an ordinary umbrella. When it is not required for use, however, the cover may be instantly detached, and the various other parts of the umbrella, being of sectional form, may be folded into a small compass and carried in the coat pocket or trunk. One of the most striking features of the device is a novel joint, between the sections of which each rib is composed. These joints are so constructed that the sections are automatically locked in properly aligned position when the umbrella is in use, and are incapable of being unlocked by accident. The umbrella cannot be accidentally deranged, but, as stated, may be quickly folded into small compass by the user.

Ben B. Strobe, Inventor, Coshocton, Ohio. Assignee—The Standard Advertising Company, same place. Dipper or Cup. The invention disclosed in a patent recently issued to Mr. Strobe, is exceptionally ingenious and of considerable commercial value. His idea is to form a complete drinking vessel, either a dipper or a cup, by the use of a piece of tin and a piece of wire without any separate attaching devices, such as rivets, solder and the like. To do this, sheet metal is spun or otherwise shaped to form the receptacle, the upper edge of which is bent over the ends of a handle formed from a piece of wire bent upon itself and properly shaped. The ends of the wire constitute a stiffening bead for the upper edge of the cup, and the part of the handle formed by the doubled end of the wire, is bent down against the side of the cup to form a brace for the handle. When the idea is carried out in the construction of a dipper, that portion of the handle which constitutes a brace seated against the side of the receptacle below the upper edge there-

of, may be a separate piece of wire, having its upper end intertwined with the wire, constituting the handle.

Horace D. Moyer, Hazleton, Pa. Process of Salting Peanuts.—The novel process disclosed in this patent is designed to impart to peanuts a delicious, salinous flavor without removing the kernel from the shell. It is generally understood that salted peanuts quickly become stale and strong by continued exposure to the air after being salted. By Mr. Moyer's process, the flavor is imparted to the nut by the injection of a saline solution into the shell through a small puncture, and the surplus fluid is preferably evaporated by placing the nut in a dryer, after which the nut may be roasted to impart the delicate flavor demanded by the trade.

Addison Vandervoort, Belleville, Ontario, Canada. Lawn Sprinkler.—This device is arranged to sprinkle a lawn over a circular area with the nozzle as a center, and is arranged to direct a portion of the water against a rotatable water wheel which operates through worm gearing to turn the nozzle in a circular, substantially horizontal path, so as to throw the water radially outward in all directions, there also being adjusting means operating automatically from the water wheel to gradually draw the nozzle downwardly from a vertical position to a substantially horizontal position, so as to gradually increase the effective radius of the stream.

Melvin Jincks & Charles W. Stanton, Cohocton, New York. Saw-Buck.—This device is particularly designed for holding the material to be cut snugly upon the buck without requiring the operator to place his knee upon the log, and consists of an ordinary buck, having base stills projected at one side thereof, with a spring-supported treadle fulcrumed to the outer ends of the stills, the treadle being hinged in the middle and projected at the opposite side of the buck and provided with a supporting roller adapted to travel upon a board hinged to the lower portion of the buck, there being a hook or chain connected to the treadle and adapted to be engaged over the log so as to hold the same when the treadle is depressed. When not in use, the outer section of the treadle and the board which supports the roller thereof, are folded up against the side of the buck, so as to be out of the way.

George B. M. Seager, Adrian, Mich. Dress Shield Spreader and Holder.—This invention consists of an arcuate continuous wire helix adapted to be fitted into the bight of a dress-shield, to which it is connected by stitches at the opposite ends of the helix, there being arm-scyes engaging fastenings carried by an intermediate portion of the helix and projected at the convex side thereof, in order that they may be conveniently clamped upon the arm-scyes of a dress waist. The helix being elastic readily yields with the movement of the wearer, and therefore is not uncomfortable, while at the same time it spreads the shield and prevents wrinkling and rucking up thereof.

Charles D. Green, Inventor, Fort Worth, Texas. Stephen Th. Westdal, Assignee, Washington, D. C. Ballot Box.—This invention is designed to be used by clubs, secret societies, etc. for the purpose of balloting in all elections in which the rules of the society or association require that ballots be cast. The ballot box is of the type in which white and black balls are employed, and one of the principal objects of the present invention is to dispense with the use of a large number of balls or marbles, and enable all the votes to be cast, irrespective of the number of members of the association, with the aid of only two balls, one white and the other black. This is permitted to be done by reason of the fact that the balls are caused to

automatically return to the front of the box or casing after operating upon the registering and alarm mechanisms, so as to render the balls accessible at all times. A folding hood is provided to prevent bystanders from observing which ball is handled by the voter.

Samuel Butz, Easton, Pennsylvania. Shirt.—With the ordinary shirt bosom there is always a tendency for the bosom to bulge and break, especially when a full dress vest is being worn, there being nothing to hold the bosom flat. Various expedients have been resorted to, to hold the bosom flat against the body, and it is claimed by the inventor that such devices have been undesirable and failed to accomplish the object sought. The present invention contemplates the use, in connection with a shirt, provided with pockets extending along the opposite sides of the bosom, of removable stiffeners encased within said pockets for preventing the bosom from breaking down or bulging transversely, and side tabs arranged at points intermediate the length of the bosom, and adapted to be connected with suitable fasteners on the shirt, whereby the stiffeners are drawn in opposite directions, or away from each other, thus preventing the bosom from bulging and breaking longitudinally.

Mr. Butz is a practical shirt-maker, and his invention is the result of many years of experience in making shirts.

Max G. Wittman, Jonesboro, Arkansas. Piano Pedal.—The object of this invention is to provide an improved method of supporting a pedal so as to render the same accessible to persons of any stature. In pianos of the ordinary construction, the pedals are not accessible to children. It is well known that music will lack the proper expression when the pedals can not be used. The attachment is readily applicable to pianos of the ordinary make without necessitating any change in the interior arrangement of the parts. Any child who is old enough to learn to play the piano may at the same time begin to learn the use of the pedals. The invention consists in providing the lower front panel of the piano with a plurality of vertical slots, and arranging a toothed pedal-rod back of each slot, and on the inside of the piano, the pedal having a spring-actuated bolt accessible from the outside which engages the teeth of the rod to hold the pedal at the desired adjustment.

Howard K. Seitz and Charles H. Hannigan, Glen Rock, Pa. Tension Device for Looms.—In the manufacture of wire cloth great trouble is experienced in properly taking up the slack of the strand at the end of the shuttle stroke. While means have been devised for doing this, there have been many objectionable features, all of which, however, have been overcome by the present device. It consists of a casing attached to the bobbin and rotatable therewith. Within this casing is arranged a collar attached to the shaft upon which the bobbin is journaled. A coiled spring is detachably connected to the collar, and an expansible friction spring detachably engages with the outer end of the coiled spring and frictionally bears against the inner face of the casing. The coiled spring is wound up during the stroke of the shuttle, but the friction spring permits the movement of the latter so as to avoid undue strain, thus when the end of the stroke is reached, the recoil or unwinding of the spring rewinds the bobbin and takes up the slack.

Charles R. Van Horn, Bay Mills, Michigan. Saw Guide.—Two patents have been granted this gentleman on guides which are particularly intended for double cutting band saws. These guides have been installed in the mills of the Hall & Munson Company at Bay Mills, the owners of the patents,

and are proving entirely satisfactory.

One of the guides is arranged directly over the work, and it consists, broadly stated, in a pair of horizontal supports attached to the saw frame on opposite sides of the upper wall. These supports are connected at their outer ends by one of the guide members, slidably mounted thereon and having means for properly adjusting the same. This guide member bears against the inner face of the saw, and another member also adjustably attached to the support, bears against the outer face of the saw. By this construction, the saw is braced at a point directly over and close to the top of the cut, and a true unvarying course is obtained.

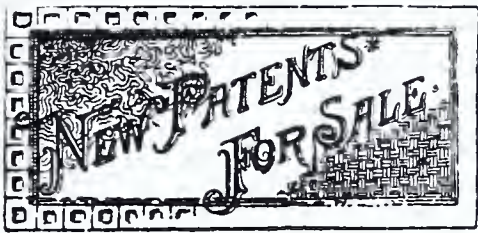
The other patent relates to a lower guide fastened to the frame of the machine. This guide is made up of two independent parts pivoted intermediate their ends, and each carrying adjustable bearing sections that are movable toward and from each other. Adjusting and holding devices are employed for securing the proper relation of the various elements, and fastening them against movement.

Rev. Wallace L. Selleck, Platteville, Wisconsin. Door Supporting Means.—Difficulty has always been experienced in placing doors in the gable ends of barns, as the projecting portions of the roof, technically known as the barge course, interferes with the proper operation of the same. Mr. Selleck has overcome this difficulty by employing a novel combination of hinges, the lower one being made of two parts having a single joint, the upper one being provided with a plurality of joints so that when the door is swung to open position, it assumes an inclination and clears the roof. The advantages for this construction will be obvious.

Edward J. Spink, Davenport, Iowa. Extension Table.—In this table the top automatically folds itself out of the way when the table is closed or contracted. To this end, the structure consists of a central section, to the ends of which are slidably connected end sections of a novel form that are provided with guides arranged beneath the level of the top. The top is formed of a central stationary section, and end sections that are flexible being made up of a plurality of hinged slats which are slidable in the above-mentioned guides. Thus when the table is drawn outwardly, or extended, the flexible portions will rest flat upon the same, but when pushed inwardly, these portions will slide down into the guideways and be housed out of the way.

Arthur. R. Gordon, Toledo, Ohio. Syringe.—The purpose of this device is to thoroughly mix the medical ingredients passed through the same. To this end, an outer casing is employed, and an inner outlet tube passes through the same, thereby forming an intermediate chamber between the two. A supply nipple connects with the lower end of the chamber, and a plurality of discharge orifices are formed in the wall at the other end. A spiral flange extends from one end of the chamber to the other, and thus not only gives a spiral movement to the liquid passing through the same, but assists in projecting the same in a whirling spray. The inner tube and the flange are all removable so that the instrument may be thoroughly cleansed.

Thomas M. Price, Inventor, Jay S. Richard, Assignee, Itasca, Texas. Nut Lock.—This lock is as efficient as it is simple. It is in the form of a washer designed to be placed beneath a nut to prevent the same from turning. It is square and provided with an angular cut extending from one edge to the bolt-opening. A portion of the washer on one side of the cut is bent outwardly to form a locking tongue which engages the side of nut, the portion on the other side of the cut being bent inwardly to form a holding foot.



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FOR SALE—Patent No. 699,461, dated May 6, 1902. Clutch Device. Can be applied to practically all makes of motors, especially the alternating class. Address Emil Dysterud, Monterey, N. L. Mexico. (sep)

FOR SALE—Patent No. 701,637, dated June 3, 1902. Mop Holder. A simple attachment whereby a scrubbing brush may be applied to a mop holder without altering the construction of the latter. Every household needs one. The patentee would like to make suitable arrangements with manufacturer. Address Mrs. Augusta L. Wilson, 1033 Berkeley Avenue, Pueblo, Colorado. (sep)

FOR SALE—Patent 513,249, dated January 23, 1894. Combined car and pipe coupling. The best, simplest and most durable ever invented. Address Wm. N. Sewell, Winchester, Ky. (sep)

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FOR SALE—Patent No. 701,061, dated May 27, 1902. Bias cutter for cutting cloth in ruffles and folds. Will sell outright or part cash and royalty. Also British patent No. 3,472, May 22, 1902. Address Frank L. Levy, Duluth, Minnesota. (sep)

FOR SALE—Patent No. 698,753, dated April 29, 1902. Propelling gear for motor vehicles. Would like to hear from manufacturers of automobiles. Address Dr. George W. Smith, Hardin, Ray County, Missouri. (ag)

FOR SALE—Patent No. 697,954, dated April 15, 1902. Underground tank or receptacle for the storage of water or for other purposes. Patentee will work Texas himself. Will sell rest of United States, in whole or part. Address Robert P. Stewart, 407 Bonham Street, Paris, Texas. (ag)

FOR SALE—Patent No. 692,128, dated January 23, 1902. Detachable shoe heel. For particulars address Vincent A. Fabricki, Box 161, LaSalle, Illinois. (ag)

FOR SALE OR LEASE ON ROYALTY—U. S. Patent No. 692,083, dated January 23, 1902. Also Canadian patent 75,213, dated March 18, 1902. Traveler's lock. Can be manufactured at small expense and sold readily. Address Henry Spear, 119 East Canal St., Richmond, Va. (ag)

FOR SALE—Patent No. 695,501, dated March 18, 1902. Butter cutting machine. Will sell entire right or lease on royalty. Best machine out for cutting tub butter. Address G. L. Smith, P. O. Box 151, Goodground, Long Island, New York. (ag)

FOR SALE—Patent No. 691,289, dated January 14, 1902. Thread and Cord Cutter. Constructed from a single piece of sheet metal. This patent is worth investigating. Address Mrs. C. P. McKim, Box 116, Newton, N. J. (ag)

FOR SALE—Patent No. 689,442, dated December 24, 1901. Cotton Chopper Attachment for Cultivators. Can be applied to any cultivator now in use. Easily attached. No extra expense in operation. Address John J. Vickers, Pittsburg, Texas. (ag)

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FOR SALE—Patent No. 698,346, dated April 22, 1902. Hose reel. Effects winding of two lengths of hose with each rotation of reel. For particulars address Albert E. Wood, 8 Akron Street, Meriden, Connecticut. (jy)

FOR SALE—Patent No. 696,622, dated April 1, 1902. Improvement in wind mills. Will sell entire right for \$2,000. Embodies improved sail adjusting mechanism. Address William Bauer, Loyal, Wisconsin. (jy)

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WANTED—Agents to sell a good patented article. Address the inventor, W. G. Lee Woods, of John Woods & Sons Bank, San Antonio, Texas. (sep)

WANTED—Agents all over the United States to control territory and sell our siphons. Would sell the patent outright. No. 697,835. Address Hudson Siphon Company, Lock Box 41, Hudson, Massachusetts. (ag)

WANTED—Capital to manufacture and sell a patent novelty. Costs about one cent. Will readily sell for twenty-five cents. Will sell patent outright or lease on royalty. Address Samuel Bristow, Wetmore, Kansas. (jy)

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Criticism of Courts.

We have been impressed in the last few years with the frequency of the expression, "Criticism of Courts." The press teems with the term, and its use has become frequent among members of the bar. Whenever a decision is rendered by a court of last resort, however much that decision may conflict with one's preconceived ideas of right or law or justice, it has become customary for certain newspapers to warn all persons not to criticise the judgment. Such criticism is treated by many as a menace to existing institutions, and the critics are held up as dangerous foes of law and order. Indeed, we have often seen certain persons and newspapers referred to as anarchists, or teaching anarchy, when a decision of the Supreme Court has been criticized. One recalls the discussions in the newspapers following the decision of the Supreme Court of the United States in the income tax case, and still later the decision of the Supreme Court on the subject of the right of Congress to legislate for our colonial possessions. The Administration papers went so far as to brand as anarchists those who criticised the decisions of the Supreme Court. How this spirit of "lese majeste" became transplanted to the soil of the Republic is difficult to fathom, for there is no reason in logic or history why courts should not be criticised, and their judgments discussed, and approved or condemned, as, like other products of mankind, they may be fit for praise or blame. We give all respect to the opinion of Mr. Justice Brewer, for no greater man has ever held the office of Supreme Court Justice. In an address he said:

"It is a mistake to suppose that the Supreme Court is either honored or helped by being spoken of as beyond criticism. On the contrary, the life and character of its justices should be the subject of constant watchfulness by all, and its judgments subject to the freest criticism. The time is past in the history of the world when any living man or body can be set on a pedestal and decorated with a halo.

The moving waters are full of life and health; only in the still waters are stagnation and death."

How true the observation! What has ever been competent to cope with the terrible power of a judicial tribunal but the power of public opinion? Free and unrestricted discussion is essential to the foundation of correct public opinion. Upon that public opinion, which is the product of intimidation or information, may rest the governing structure for a time, as a house built upon the sands, but with the storm of the awakening of public conscience will come the downfall. It was only a short while ago that a Chicago judge fined and imprisoned for contempt of court certain editorial writers for criticising his decree in a matter before him. Fortunately, however, Chicago had a judge possessed with brains sufficient to see that the act was a gross injustice, and the men were released. We have no place under our institutions for a judiciary which is so thin-skinned that it cannot bear criticism of its actions.

Cross-burdened, thorn-pierced, a man-God tottered to His martyrdom; but the tragedy which crimsoned Calvary and saved a world was not a murder, it was a court's decree, for Pilate wore the ermine. Shall no man criticise his judgment?

Economic Loss in Smoke.

The demand for a smoke consuming furnace is world-wide. Although a large number of patents have been granted on different plans, it yet remains for some inventor to patent the idea which will bring into being an invention that will equal the greatest discoveries of the past.

In the AGE for November, 1901, reference was made to the trouble that London is experiencing with coal smoke. Germany has also enlisted in the fight against that intangible despot.

In a recent article which appeared in *American Medicine*, reference was made to an experiment conducted at Manchester, England, last fall, which makes clear the pecuniary loss in unburned smoke. At a point about three miles from the center of the city a sample of snow which had been lying on the ground for ten days, was melted, and the dry residue weighed and analyzed. It was found to be equivalent to something over ten pounds to the acre, and consisted of 48 per cent., of carbon, 6 per cent., of grease, and 44 per cent., of ash. Another sample taken from near the center of the city showed about one ton of soot per square mile.

In Chicago, the Edison Company, recognizing the axiom that "smoke is horse-power going up the chimney," has appropriated \$20,000 to carry out plans to save some of the loss that it sustains in this way.

In the city of Washington, the problem of smoke abatement is an ever-present one, causing much concern to the city authorities as well as private individuals. The police court records show that most of the principal establishments in the city have been fined at one time or another, and in numerous instances, many times for violations of the smoke law, and yet

Washington is not a manufacturing city. When arrested, the parties claim that there is no practical smoke-consuming furnace on the market, and judging from reports from other cities, this would appear to be the fact.

The pecuniary returns from an invention which would successfully solve the problem would be enormous: and we do not know of any invention which is more seriously needed than a practical furnace for consuming smoke. That the invention will be made in time we have no doubt. It can not come too soon.

The Ethics of Patents.

Among physicians it has long been considered unprofessional for one of their number to patent a medicine or a surgical device, and it would appear from recent events that some members of the engineering profession are taking a similar view. In a paper read before the "American Society of Civil Engineers," A. R. Elderidge ridicules the idea. As he says:—

"One does not see or hear of any objection being raised when an engineer copyrights a book which he writes or even compiles, yet wherein is to be drawn the fine distinction between a patent and a copyright? An article, a device, a method of manufacture may be patented, whereas a book may be copyrighted. In either case others than the owners of the patent or copyright are restrained from using the article or the contents of the book, without compensation in one form or another being paid to the holder of the patent or copyright."

It has never been considered unprofessional for a physician or a scientist to write a book and copyright it. Just why there should be a prejudice against patenting an invention made by the physician has never appeared to us to be reasonable.

New Theory of Wireless Telegraphy.

That wireless telegraphy depends on disturbances of potential in the earth, regarded as an electrically charged sphere, rather than on Hertzian waves, as is usually supposed, is maintained by Rankin Kennedy, who has been unable to swallow or digest the usual statement that the workings of wireless telegraphy depend upon Hertzian waves, since he has been unable to see why such waves should be able to bend around the curved surface of the earth through many degrees of arc. His suggestion is very plain, and is as follows:

"The earth may be regarded to all intents and purposes as an electrically charged sphere whose charge is at zero potential. If a disturbance is set up in this charge—which we are led to believe resides upon the surface of the earth, through the connection of an insulated capacity and a spark-gap with the earth, surges of current are caused to flow: then, inevitably, ripples of electro-static disturbances will radiate out from the disturbing point, and these may be detected at great distances by means of appropriate apparatus sensitive to electric waves. It makes no difference whether the sending and receiving circuits are parallel."

The Love Germ.

We knew it would come. Nature could not keep the secret longer. At last it is out. The germ of love has been found. It will not be safe hereafter for even the staid spinster to walk the streets alone. The cause for all of this alarm is due to two French savants, Profs. Fere and Fleury, who, in a book just published, state that love is caused by a bacillus. They also declare that they will soon have this infinitesimal parasite on microscopic view. They claim that in a few years they will be able to inoculate people so that every shy damsel will be at the mercy of her sighing swain, but they assure us that they will be able to place in the hands of the health boards sufficient antitoxin to counteract the advances of the unscientific lover. When this thing comes to pass, amatory affairs are to be turned over to commissions, with regulations as strict as those governing a smallpox quarantine.

This is indeed a dismal picture for all of us, for it shatters the only remaining illusion that science has left us. Cupid with his bow and arrows is feared no longer, and his poisoned shafts have not a tithe of the potency possessed by the pellets of some hump-backed apothecary.

Still, it has its bright side. Love-making can be reduced to a system, and ill-mated couples will be the exception. Match-making mammas will no longer have to resort to the uncertainty of the dance and the seashore flirtation. Inoculation with the newly discovered bacillus will do the work with mathematical precision and at a trifling cost. Where will it all end? is the thought that springs uppermost in the mind of the layman.

Edison's New Storage Battery.

Great results are prophesied from the recently invented storage-battery of Thomas A. Edison, in which iron and nickel are used instead of lead, with the result that great lightness is attained. The battery is now nearly ready to be put on the market. We will soon see if the reports of its wonderful success are justified. In a recent interview Mr. Edison is quoted as making the statement that a speed of 75 miles an hour will be easily attainable in a properly constructed vehicle. There will be no running expense except the cost of current, and it will not be possible in the streets of New York to exhaust the battery in one day. The battery will not deteriorate and will be capable of the same speed throughout.

The main feature of the Edison battery is that it is indestructible, as it can be charged and recharged without perceptible change in materials. It is an iron-nickel cell, or, in other words, the negative pole or positive element is iron, and the positive pole or the negative element is a superoxid of nickel. As contrasted with the old lead storage-battery of 186 pounds per horse-power hour, the Edison battery is only 53 pounds per horse-power hour.

As stated by *Electricity*:—"That Mr. Edison's battery is an improvement over the majority of storage-batteries now on the market we do not doubt; but before giving absolute credit to the statement that it will revolutionize the automobile industry, we should like to see some further tests with official reports of the same."

The daily press usually has a way of exaggerating the importance of new inventions, and while it cannot be doubted that Mr. Edison is entitled to much credit for what he has done, it will be many years before a storage battery will take the place of the underground electric system as a means of tram-way locomotion. In fact, the main utility of the storage battery would seem to be in its use on automobiles.

SCIENTIFIC

PROGRESS.

Insulator For Wires.

A rather novel scheme for insulating conducting wires has been patented by Messrs. Hermann & Ernest Hammesfahr, of New York City. Their idea is to incorporate in the insulation a covering layer formed of strands of filaments of spun glass braided upon the same in exactly the same manner that textile covering is now applied. One or more layers of this braided spun glass may be employed, and they may be separated by an intermediate layer of braided cotton threads. The exposed face is suitably varnished so as to protect the thin filaments.

Track-Laying by Machine.

A new machine for laying railroad tracks is being used in Pennsylvania. It has proved itself capable, with a crew of forty men, of putting down two miles of track in a day. The track-layer has a huge crane, sixty feet long, which projects forward over the road, and it hauls behind it a train of sixteen flat cars loaded with ties and rails. A continuous double line of the latter moves forward over rollers and carries the ties with it. Both rails and ties are seized at the proper point by the machinery and placed on the road in front of the train, where they shortly form part of the track over which it passes. This device is said to be the most rapid and the most economical mechanical track-layer invented.

Preparing Sand Molds.

A new method of preparing sand molds for steel castings has been patented by Mr. Herbert B. Atha, of East Orange, N. J., whose object is to provide a mold that will effectually resist the high temperatures of the molten steel, and prevent the solid matter of the wash or covering applied to the sand from melting, and injuring both the mold and the casing. In carrying out the invention there is applied to the surface of the molded sand a composition consisting of a fine carbonate of magnesium, a highly volatile or inflammable liquid, such as alcohol, gasoline, benzine, naphtha, or other liquid having higher volatility than water and rosin. In usual practice the mold is first shaped, employing "green" or damp sand common in making molds for steel castings. The sand is suitably packed about the pattern, and the latter is withdrawn from the sand after the customary manner. The surface of the green sand mold is then washed with the composition.

Welding Steel.

A new composition for welding steel has been patented by Mr. Charles Pangborn, a resident of Kalamazoo, Michigan. The composition consists of iron chips, eighty-five pounds; boracic acid, fifteen pounds; gelatin, six ounces; water, one and one-fourth quarts. The gelatin is to be dissolved in the water by heating together and then added to the iron chips and thoroughly mixed. Then add the acid and mix thoroughly. The gelatin is

merely to make the acid adhere to the iron. By the use of the above compound, steel can be welded as easily as iron.

While borax and other ingredients for the same purpose have often been used in these compositions, boracic acid has never been employed. The objection to borax is that it crawls off heated steel, making it necessary to repeat the operation and requiring careful handling to prevent the compound falling off. By the use of boracic acid, however, the compound adheres to the steel even if the latter is placed in the fire in an inverted position. Furthermore, the steel will weld at a lower heat with boracic acid than with borax, thus lessening the chance of overheating the metal.

Hardening Copper.

A process of hardening copper has been favorably passed on by the Patent Office, the invention being credited to Messrs. Stanley L. Walter and Frederick W. Keiner, of Ekastown, Pa.

In carrying out the process there is taken of the following ingredients by weight: copper, thirty-two parts; aluminium, five parts; powdered charcoal, one part. The aluminium and charcoal are first placed in a suitable crucible or furnace, and the copper is then added as superposed mass. Heat is applied to the crucible to fuse the metals, causing ignition of the charcoal, the carbonic-acid gas from which passes upward through the copper, carrying off any moisture contained in the metal, and forming above the crucible a cushion of highly-heated gas that will operate effectively to preclude entrance of atmospheric air to the crucible, thereby obviating any possibility of oxidation of the metal, whereby an intimate combination thereof will ensue. By reason of the fact that copper is placed on top of the aluminium, it will, by its greater specific gravity, and upon fusion, sink down upon and become thoroughly combined or incorporated with the aluminium without requiring any mechanical agitation or stirring to produce the required combination. The resulting alloy possesses qualities of toughness, and closeness of fiber that renders it valuable in arts requiring a metal possessing these qualities, and the added quality of being non-oxidizable in character.

Wanted—A New Safety Fuse.

It does seem that after so many years experience our electric railway engineers and inventors might have attained something better in the little detail of safety fuses. As they are, these devices are fairly to be considered protective of the motors and other parts of the equipment, even though occasionally the "blowing" from overload causes a blaze for a time, and now and then a serious fire. But they do not protect the traveling public against nervous fright and dangerous panic. The latter become more marked on the elevated roads.

Apart from the alarm occasioned and the possibilities of fire, even if remote, the delay of traffic is almost intolerable. Let a fuse blow on a trolley

car on the Brooklyn Bridge. Immediately the car is stopped and dozens behind it are stalled, and often thousands of hurrying passengers impounded while the blown fuse is being replaced.

It seems a comparatively simple problem to arrange the fuse in such a manner that the arc can not possibly cause fire. Equally simple would it be to construct a fuse box in some sort of magazine form, so that but a second or two would be required to turn an exposed and easily accessible handle and bring a fresh fuse into the circuit and restore the status. It might even be considered possible to have this action of renewal automatic to some extent.

If inventors are shy of such a simple problem, surely our electric railway companies possess the necessary ingenuity among their mechanics and engineers. We would like to see them exert themselves in this direction.—*Electrical Review.*

Another New Explosive.

Masurite is the name of the substance said by *Cassier's Magazine* to be the latest high explosive on the market. It appears to be in every sense a safe explosive, failing to detonate under the most trying conditions that are ever likely to be brought accidentally, and yet affording admiral evidence of great destructive power at the right time. Recent tests are said to have demonstrated satisfactorily that it is insensible to shock, concussion, heat, or cold, as far as its liability to explode by any of these means is concerned, and that it can be exploded in the proper manner only by means of a double-strength exploder.

Red-hot irons were run through the powder, both loose and in cartridge form, the result being simply to fuse and burn it while in direct contact with the heated surface, the powder going out upon removal of the iron.

A notable feature of masurite is the flameless character of its explosion. This was particularly evident when dynamite and masurite were exploded together, the former giving off a vivid flare of light. In the absence of flame, lies the great value of masurite for coal mine work, as it will not ignite coal-gas or dust in the neighborhood of a blast.

Experiments in Matches Without Phosphorus.

In 1898, an international competition for a paste for matches not containing white sulphur was announced, and a prize of \$9,650 was offered by the Belgian Government to the inventor. The commission appointed to judge results has now declared that, after four years of careful experiment and analysis, it has been found that none of the products so far submitted fill the required conditions, being defective in inflammability, igniting on all surfaces, or, in igniting, ejecting inflammable matter containing some poisonous substance. The sum already expended in the matter amounts to \$1,578.35 and covers cost of printing, correspondence with foreign countries, purchase of material, analysis, and experiments.

DELINTING COTTON SEED.

How it Affects Export Trade.

A writer in *Ginner & Miller* of Dallas, Texas. (Mr. R. Derdeyn) sets forth some very important reasons why cotton seed should be delinted in this country before being exported. In part he says:

A large part, probably over half, of all our cotton seed oil and cake is exported to Europe. Shipping these products abroad is a very expensive business.

The whole system is cumbersome and wasteful in the extreme, and entails much useless expense, notably the freight from the gin to the mill on the dirt and foreign matter contained in the seed, the cost of sacks to ship them in, where such are used, and the cost of the sacks and barrels to export the cake and oil in, and the freight on these packages.

All this wasteful expense can be avoided and saved by simply cleaning the seed at the gin, and exporting them direct to foreign countries in the free package provided therefor by beautiful nature, to-wit: the hull of the seed.

This exportation of the cotton seed has only recently been made possible by the invention of the cotton seed delinter. This is a machine that takes off the short fibers surrounding the hull of the seed, thereby not only cleaning this hull, but saving the fibre, which is a valuable paper stock.

Many such machines were invented, but, apparently, all but one proved failures, since, at no time, was any serious quantity of cotton seed delinted by them and exported.

From information at hand, it would appear that New Orleans is the only port through which any delinted cotton seed were exported the current season. This port shipped out to date about sixty-three hundred (6300) long tons of delinted seed, nearly sixty-one hundred (6100) of which were delinted by the Baxter delinter machine. None delinted by any other machine were exported.

It is clear from the above that a large saving is to be made by exporting the raw delinted seed as against exporting the manufactured product, and that it is perfectly feasible to do so.

Making Electric Brushes.

A new process of making electric brushes has been patented by Mr. Robert D. Laughlin, of Ravenna, Ohio, and the National Carbon Company of Cleveland, Ohio, has purchased the same. The object of the invention is to cheaply produce an electric brush which is not liable to become warped or cramped during the manufacture thereof, especially during the baking process. It consists, broadly stated, of an electric brush composed of a mass of baked carbon, in which are embedded a plurality of separate wires that run longitudinally only through the brush, and it also consists in the process of constructing the same. In carrying out this process, a plate of green carbon is formed by forcing plastic carbon through suitable dies, thereby forming ribbons of the required thickness and widths, which ribbons are cut to the proper length to form the plates. Certain of these plates are provided on their opposite side faces with longitudinally disposed grooves in which copper wire of the desired gage is wound. The plates are then laid together, the outermost however, being plain and not having wires. Suitable pressure is applied to these plates to unite them in a homogeneous mass of carbon in which the wires are embedded. This being accomplished, the brushes are then baked in the usual oven and completed. Before they are used, however, the ends are ground off, thereby removing the wire loops which connect the respective longitudinal strands of the wires.

Dr. Jacob S. Baughman,	Physician and Inventor.
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IN APRIL, 1858, Mr. C. Baughman and his family, then consisting of his wife, Catherine, and three children, moved from Wayne County, Ohio, to Davis County, Iowa, where on the 6th day of July, the subject of our sketch, Dr. Jacob Schrock Baughman, was born. He was reared on the farm owned by his father. Owing to the great distance to school, and the scarcity of help in planting season, his early education was much neglected, but in the fall after he became of age, he had prepared himself sufficiently well to teach his first term of school. Thereafter he taught and went to school until after 27 years of age. He attended school at Lombard University, in Galesburg, Ill., and at the State Normal, Kirksville, Mo., completing the two years course there in 1883, and part of the studies in the third and fourth years work in 1885. In 1886 he was engaged as private secretary for Mr. Hayworth, the inventor of the Automatic Check Row Corn Planter, which experience has been of material benefit to him in exploiting inventions patented by him in



DR. JACOB S. BAUGHMAN.

later years. In 1887 he was united in marriage to his first wife, whose maiden name was Melvina E. Vaneton, with whom, after spending a short time in Topeka, Kansas, he moved to Burlington, Iowa, where he now resides.

In the line of inventions his first work was for the improvement of "dress cutting charts" in which at the time of his marriage his wife had part interest. This they completed together, and copyrighted it under the name of the "Glove Fitting Garment Cutter," in 1888. In 1889 an application was made for a patent on an invention in "Adjustable Pattern Plates" for cutting ladies' dresses, and the patent granted in February, 1890, since which time it has been widely exploited in the United States and Canada, some of the goods being shipped to England and other countries. In June, 1890, another invention in the same line was patented, and added to the above.

On June 11, 1895, he was granted a patent on a new invention on Down Spout Filter for Cisterns, both in the United States and Canada. This invention has upon its own merits been called for quite extensively. Upon exhibition at the Illinois State Fair, it won the silver medal, the highest award for improvements in waterfilters. Its simplicity enables any one to care for it and always keep it in good working condition.

On January 4, 1900, he made application for a patent on a Head Bandage, and in May of that year, this patent was issued to him. This invention, like many others, had its origin in necessity. Dr. Baughman, at this time being a student in the new healing art. Osteopathy, had just gone through a severe spell of sickness which left him very weak, and consequently, through lack of vitality, was unable to keep his mouth closed during sleep, thus causing a dryness of throat and wakeful nights. It was necessary, therefore, to prevent this trouble, and, as a result, the above invention was perfected and patented.

In June, 1901, a patent on Improved Plates for Cutting Ladies' Dress Skirts was obtained. This appealed so favorably to the modistes of our eastern cities, that he also applied for and obtained Letters-Patent on the same in England and Canada. This, taken with the Adjustable Tailor System patented by him, makes his system the only automatic calculating machine ever invented for cutting ladies' dresses. It absolutely divides the entire garment according to measure taken, and style desired. No figuring of any kind is necessary.

On February 14th, 1902, his claims on one of the most novel articles yet placed before the public, were allowed, and the patent issued to him June 24th, 1902. This invention pertains to a new and useful Menu Card Holder, provided with push buttons so arranged on either side of the holder, that the guest is enabled at his leisure to press any button opposite the article of food which may be wanted in his order. Without any words being passed between the guest and the waiter, the order is then filled. The waiter being enabled at a glance to tell what is desired, he presses another button arranged at top of the card holder and thus releases the card in full. This instrument will revolutionize the hotel waiting business, and enable guests to be served without the usual annoyance of calling off the order, or having to put up with the usual mistakes made by waiters for want of memory.

His later patents were taken out through the offices of E. G. Siggers, Washington, D. C.

In January, 1900, he graduated from the American College of Osteopathy at Kirksville, Mo., under the founder of this science, Dr. A. T. Still, and at once entered into the practice of his chosen profession. In June of the same year, he associated with him in his practice, Dr. Nanny Randolph Ball, then a student at the same school, now a graduate of the American College of Osteopathic Medicine and Surgery, Chicago, Ill. While thus engaged, these parties designed and completed a chart illustrating Physiological Chemistry, this being the first time in the history of medicine that this complex subject had ever been so simplified as to present it in all of its functions to be viewed in its wonderful workings by the eye of man. This proved so popular that there has been issued to them, through the efficient work of Mr. Siggers, a copyright in the United States and Great Britain. This chart is hailed by all students of physiology and physiological chemistry as the simplest and yet the most complete arrangement of the subject ever published. In the language of Professor J. Martin Littlejohn, Ph. D., M. D., D. O., Editor of the Journal of the Science of Osteopathy, and President of the American College of Osteopathy, Medicine and Surgery, Chicago:—

"In this chart, true to the order as well as the progress of functions and organs, the authors trace the proteid, fat, and carbohydrate of food from the mouth through the meshes of mastication, digestion, etc., diagrammatically illustrating all the changes that take place. We have an excellent bird's eye view of the great chemical laboratory of the human body at work, apartment after apartment in the great

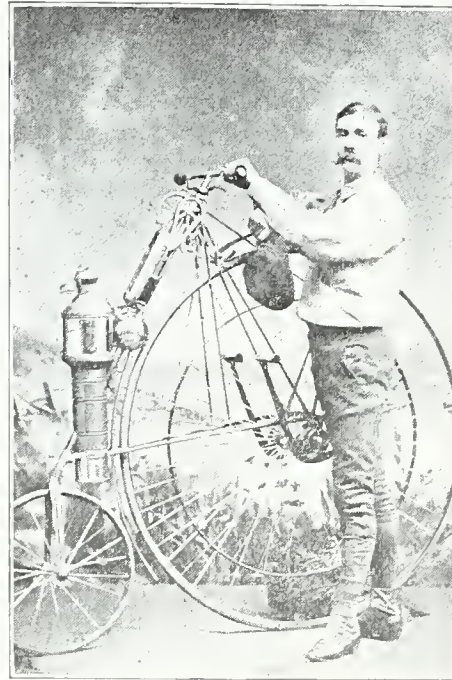
compounding and modifying work of the body revealing their secrets. Organ after organ, tissue after tissue, until none are silent, speak of the activity in the chemical actions and reactions upon which the body life is based."

On September 18, 1901, the authors of the chart were united as partners for life, in holy matrimony, at the home of the bride's father, Capt. G. Washington Ball, 3070 Q Street, N. W., Washington, D. C., and are now located at Burlington, Iowa, where they are meeting with the best of success in the practice of their profession, while at the same time the Doctor keeps under his general supervision all engaged in the manufacture and sale of articles patented by him.

The Doctor is still a young man, and we predict for him much greater success in the future, both from a professional as well as a pecuniary standpoint.

A TWENTY YEAR OLD MOTOR BICYCLE.

Through the courtesy of Mr. G. E. Giroux, of the Haynes-Apperson Company, Kokomo, Indiana, and Mr. William S. Kelley, of the H. B. Smith Machine Company, Smithville, N. J., the AGE is able to give its readers full information about one of the first power-driven bicycles made in this country.



The illustration represents a bicycle of the old Star pattern, having a small steering wheel in front, the main wheel being driven by pedal levers with straps and clutches.

The name of the inventor is Copeland, a resident of Denver, Colorado, and he is represented in the photograph as grasping the handle bars. In constructing the wheel, Mr. Copeland mounted a small boiler just over the front wheel, used oil as a fuel, and steam as power. The engine is shown mounted on the steering bar above the boiler, and it communicated its power by a small chain or belt, to a pulley or wheel which is fastened at one side of the spokes, concentric with, but some distance from, the rim. This little engine generated sufficient power to run the wheel at a fair speed on level roads, and it was quite an assistance in hill climbing.

As will be seen from the illustration, Mr. Copeland displayed considerable ingenuity in arranging the engine and the necessary driving connections so as to be out of the way, and not interfere with the use of the bicycle under

ordinary circumstances; for it is apparent that the bicycle could be driven by the usual lever pedals, just like any other Star bicycle, when the steam motor was not in use. The parts were so arranged that the motor could be thrown into operation at any time when a very steep hill was reached, and additional help was required to run the machine.

Mr. Copeland visited the works of the H. B. Smith Machine Company with his bicycle so fitted up, about the year 1884, and while in the employ of the said company, helped to design and perfect a power tricycle—practically a three-wheel automobile. The frame of his second machine was hollow, of L-form, so as to make the wheels track in regular wagon tracks on the road. This hollow frame was a receptacle for the oil which was used as fuel. A small boiler was located between the two wheels, which were on the right hand side, the rear wheel being the driven one, and the front being the steering wheel.

The engine was mounted on a part of the frame and provision was made for two rates of speed, one at four miles an hour and the other at twelve. The power was steam, and the mode of generating was that of burning oil and steam combined. This automobile or tricycle was used on the roads in and about Smithville, N. J., in the years 1886-87, but as it frightened horses, some fault was found with it on that account, and it was withdrawn from the road and stored in the shops of the H. B. Smith Machine Company, where it has remained ever since.

The Earth as a Steam-Boiler.

More than one advanced thinker has proposed a plan to utilize in some way the enormous internal heat of the earth. That such utilization may actually be accomplished is now believed by some scientific men. No less a person than Prof. T. C. Mendenhall made the suggestion recently, and now a series of measurements of underground temperatures is being made by the British Association for the Advancement of Science. Prof. William Hallock, of Columbia University, in an interview reported in *World's Work* expresses his belief that the idea is feasible. He says:

"It is not merely a question of getting steam, it is a question of the quantity of steam that can be had. Hot water is even now drawn from a well and used to heat a dwelling near Boise City, Idaho; and when we pumped out the water which had leaked into the well near Pittsburg, it was so hot that I could not hold my hand in it. Its temperature was about 130°. But while the Pittsburg and the Wheeling wells are capable of heating the water that is left in them over-night, even if their depth were sufficient to turn that water to steam, it would require many hours of waiting, which would rob it of all commercial value. In other words, there would be not the slightest difficulty in obtaining steam from the earth's interior, because that involves merely a little extra labor in boring down into the very hot area, and it is as easy comparatively to bore 10,000 feet as it is to bore 6,000; but in order to give the steam commercial value a method must be provided for dropping the water to the hot area, allowing it time to heat, and yet having it returned to the surface as steam without for a moment interrupting the flow."

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies for \$1.50.—Please give correct data in ordering.—Address

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Fertilizer distributing receptacle. Plant..... J. E. Edwards
Fiber. Machine for reducing wood to..... W. K. Squier
File. Bill..... P. H. Yawman
Filing cabinet..... P. H. Yawman
Filing tray. Card index..... A. H. Miller
Filing machine. Centrifugal..... N. Ceipek
Filter..... G. F. Hodgkinson
Filter. Coffee..... A. F. Shriver
Filter. Water..... J. W. McLean
Firearm..... W. F. Cole
Firearm. Automatic..... J. A. N. Rasmussen
Firearm. Recoil operated..... J. M. Browning
Firearm sight..... J. M. Browning
Fire escape apparatus..... R. B. Hemming
Flood gate..... H. B. Casperson

Flax or hemp straw. Machine for treating..... J. T. Smith
Floors, walls, windows, &c. Appliance for cleaning..... C. W. Snellebrand et al
Fluids. Device for indicating the rate of flow of..... J. Patten
Flushing apparatus..... C. B. Day
Folding box..... Z. B. Webb
Folding table, shelf, or desk..... G. A. Ank
Foot warmer..... J. P. McAbee
Foundations. Sinking..... A. Goerke
Fuel burner..... C. A. Dally
Galvanic battery. Reversible..... T. A. Edison
Game apparatus..... H. W. Standidge
Game board..... G. N. Johnson
Game counter..... W. J. Lewers
Garment supporter..... V. Keller
Gas and air mixer..... G. A. Loeben
Gas burner..... C. W. Currier
Gas generating apparatus..... W. J. Faulkner
Gas generator. Acetylene..... J. W. Weeks
Gas generator. Acetylene..... J. A. Mosher
Gas. Making water..... E. Fleischer
Gas purifier..... D. O. Freeman
Gas washer..... P. Riecke
Gear. Reversing..... C. F. Smith
Gear. Variable speed..... F. B. Cockburn
Gearing. Differential..... R. G. Small
Gold. Manufacture of colloidal..... C. Paal
Golf ball..... F. H. Richards
Golf ball..... 6 pats..... E. Kempshall
Golf ball..... 2 pats..... F. H. Richards
Governor. Engine..... J. F. O'Neill
Grain drill..... C. H. Pelton
Graphophone..... E. P. Felt
Grappling hook..... D. White
Grass and ditcher liner..... J. M. Churchman
Gun sight..... J. Becker
Hair drier and comb. Combination..... C. E. Bradshaw
Hair fastener..... R. E. Glass
Hammer. Magazine..... W. Jacoby
Harness..... A. Wood
Harrow. Spike tooth..... T. D. Jones
Harvester attachment..... C. F. Craver
Harvester. Peanut..... C. R. Wyborner
Hat guard..... A. Stamm
Hat or head gear..... J. Heimann
Hay rake..... A. W. Zimmermann
Heater and drier..... L. D. Vogel
Heating apparatus. Water..... R. Stubbs
Heddle motion. Selvage..... J. Wilkinson
Hinge. Door..... W. L. Evans, Jr
Hinge. Spring..... J. B. Howles
Hoe..... G. H. Grapes
Hoe. Hand..... J. D. McCrimmon
Hog or cattle splitting machine..... J. C. Hughes
Hook and eye..... S. W. P. Lea
Horseshoe. Rubber tread..... H. C. Frost
Horses. Fastening device for driving..... P. Mayotte
Horses' legs with water. Appliance for treating..... J. T. Studley
Hose coupling..... J. E. Atkinson
Hose coupling fastener..... C. Frankish
Hothouse construction..... H. Pladeck
Hub. Vehicle..... E. Sendelbach
Hydrocarbon burner..... C. J. Johnson
Ice cream freezer..... H. Mosebach, Jr
Ignition apparatus. Electrical..... H. T. & H. A. Dawson
Illustrating apparatus..... F. S. Newman
Insect destroyer..... S. V. Graves
Insect exterminator..... M. Kurth
Insulating and waterproofing materials. Manufacture of electrically..... F. Greening
Insulating paint..... L. M. Randolph
Insulator pin machine..... A. D. Catlin
Internal combustion engine..... F. Reichenbach
Japanning small articles. Machine for..... T. A. Perrins
Jewel case, &c. Portable..... E. J. Deitsch
Journal box dust guard..... C. S. Shallenberger
Keying clamp. Flooring or siding..... B. F. C. B. & C. D. Arnold
Kitchen utensil handles. Holder for..... W. R. Daughtry
Kite or flying machine..... V. Tarczal
Ladder. Double or step..... E. Bardin
Lamp. Electric arc..... G. G. Tilden
Lamp. Gas..... L. C. Fuller
Lamp. Incandescent electric..... A. A. Chaillet
Lamp socket. Incandescent..... C. A. Chase
Lathing machine..... 2 pats..... S. Snow
Lathe attachment..... J. D. Hewitt
Lathe feed..... B. M. W. Hanson et al
Lathe turret stop..... B. M. W. Hanson
Leveling instrument..... G. H. Prier
Life preserver. Automatic self inflating..... J. Graham et al
Lifting jack..... E. Woodings
Lightening conductor..... F. E. Klein
Limb. Artificial..... I. R. & W. D. Fenner
Limb. Artificial..... H. Yearsley
Linotype galley..... F. E. Milbolland
Liquid drawing device..... L. H. Handv
Loom harness eveners..... A. S. Cowan
Loom picker operating mechanism. Swivel..... F. Brown
Lubricating device..... A. Lofdahl
Lubricator..... H. Harris
Lubricator..... H. A. Lyddon
Machine parts. Flexible device for connecting stationary or movable..... F. Reichenbach
Magnifying glass. Binocular..... F. Berger
Mail bag crane..... L. B. Sweetland
Malted biscuit and making same. Granular..... J. Lambert
Maps. Manufacture of spherical..... H. Heurijean et al
Margarin, &c. Machine for kneading and washing..... L. B. Donkers
Match safe..... W. G. Hurley
Measure. Tape..... W. Chesterman
Measuring the areas of surfaces. Machine for..... J. E. Nightingale
Metal receptacles. Apparatus for shaping..... M. L. Deering
Metal receptacles. Shaping..... M. L. Deering
Metals on metallic surfaces and the products thereof. Depositing..... S. Cowper-Coles
Mixing machines, &c. Conveyor for..... C. T. Drake

Moistener, Ervelop and stamp, G. M. Williams
Molding machine..... J. Stuart
Mop..... H. A. Hayden
Mop holder..... A. L. Wilson
Mosquito bar or canopy support..... P. Jung
Motion transmitting mechanism, Variable..... J. Nielsen
Muffle furnace, Continuous..... (reissue)..... W. Dickens
Nail machine, Wire..... J. H. Clark et al
Nasal shield..... T. Carence
Nest for hens, &c..... D. V. Miller
Nut lock..... B. W. Bo'en
Nut, Lock..... J. L. Alger
Oar..... K. C. McNeill
Oar lock..... E. F. McIntyre
Oil or gasoline can, L. E. & E. H. Morris et al
Ordnance recoil apparatus..... K. Deintlein
Packing and displaying box, Combined..... W. Schrader
Packing case..... G. W. Peck
Packing device, Metallic..... F. A. Irons
Paddle wheel, Feathering..... J. Merkel
Pail..... F. J. Garvey
Pail, Milk..... J. Griffin
Paint..... C. M. Hall
Paint..... T. L. Lee
Paint, Making..... D. J. Ogilvy
Paper box machine..... A. Kochs
Paper cleaner, Wall..... W. Adcock
Paper hanging machine..... C. Holmes
Paper holder..... J. S. Basom
Paper of variable thickness..... C. C. Jenks
Paper, Treatment of waste material for use in the manufacture of..... R. Dietrich
Papers, letters, &c. Holder or file for..... M. J. Widenhofer
Passenger or goods elevator or conveyer..... W. H. Aston
Pasteurizer..... W. J. Ruff
Peat press..... A. Dobson
Pedal attachment..... R. Gross
Penholder, Pen point ejecting..... H. C. Stiefel
Pencil holder..... F. J. Kamber
Photographic plate holder..... W. N. L. Davidson
Piano players, Double bellows action for pneumatic..... T. P. Brown et al
Pile fabric, Machine for cutting loops of..... J. D. Knowlton
Pile fabric, Woven double..... J. Killars
Pipe wrench..... W. Love
Placket closing device..... C. Brandt
Plane guide, Bench..... G. G. Dennis
Planter..... J. M. Walton
Planter, Corn..... L. P. Graham
Planter furrow opening and covering attachment..... W. A. Harper
Planter, Seed..... E. F. Israel
Pneumatic carriers, Automatic switch for..... F. R. Taisey
Pneumatic surfacer frame..... H. G. Kotten
Pole, Vehicle..... G. W. Conrad
Powder and compounding same, Smokeless..... J. A. Denton et al
Powder, Smokeless gun..... C. O. Lundholm
Power applying and transmitting apparatus..... J. H. Hardie
Pressure gage..... E. C. Bates
Primary battery..... E. M. Fishell et al
Printing machine..... J. L. Firm
Printing machine inking apparatus..... C. P. Cottrell
Printing press..... G. P. Fenner
Printing press inking roller..... J. P. Marks
Puddling iron..... R. A. Carter
Pump cylinder check valve..... J. W. Park
Pump, Fluid pressure..... J. McCulloch
Pumping engine, Electric..... S. Rinnau
Pumping power, Oil well..... G. D. Newton
Punching press guide..... T. & J. R. Conley
Pyroxylin compound..... I. Kitsee
Rail brace and support..... H. P. Wilson
Rail or similar conductors, Mechanism for removing ice and snow from third..... E. Chamberlin et al
Railway or tramway vehicle..... D. D. Coath
Railway tie, Metallic..... C. S. Shallenberger
Railways, Electropneumatic switch system for electric..... W. H. Cummer
Raisin or fruit elevator..... W. M. Ewing
Ranges or cooking stoves, Hot blast for..... J. B. Ehrlich
Reaping machine..... E. A. Peck
Register, ventilator, or the like..... H. S. Hart
Rein holder..... O. Saterbakken
Removable handle..... C. M. Phillips
Ring making machine..... L. Lehr
Rivet machine, Solid die..... M. T. Stangeland
Riveting or punching tool, Hydraulic, C. Wigtel
Rolling tubes, Heating mandrels for..... G. H. Everson
Rope fastener..... F. B. Adams
Rotary engine..... F. A. Headson
Rotary engine..... S. C. Shepard
Rotary engine..... W. F. Bangs
Rotary steam engine..... J. F. Craig et al
Sails, Shifting top..... A. Keegan
Sales slip and blank therefor..... S. & S. R. Shoup
Sam ple case and exhibitor..... S. M. Wixcel
Saw, Butcher's..... G. Meyer
Saw filing device..... J. H. L. & G. A. W. Folkers
Sawing, jointing, and boring machine..... C. E. Sandstrom
Sawing machine..... F. J. Pahls
Seal, Metallic..... H. C. Kossow
Seeder..... W. Stephenson
Seeder adjusting device..... W. Stephenson
Self closing gate..... E. H. Carpenter
Sewing machine, Mattress..... H. S. Martin
Sewing machine shuttle mechanism..... C. T. Warren
Shade cord clamp, Window..... E. J. Wells et al
Shaft door and stage locking device, A. Grothe
Shafts, Sinking..... G. J. Maas
Ship's log apparatus, Electrical..... T. F. & T. S. Walker
Shoes while polishing same, Device for supporting..... C. G. Keller
Shovel..... J. W. Ellison
Show case..... A. Reinle
Sifter or strainer, Culinary..... J. F. Foster et al
Signal..... B. B. Baker
Silver, Manufacture of colloidal..... C. Paal
Sleeve protector..... H. M. Wood
Slot machine..... W. Klepetar
Small arm..... A. Frank
Smoke consumer..... D. Clump et al
Snap hook..... J. Grigg
Snap hook..... R. W. Levitt
Soap article..... H. L. Boswell
Sound motor..... W. L. Smith

Speed mechanism, Variable..... J. E. Caps
Speed mechanism, Variable..... A. Laidlar
Spinning spindle..... 2 pats..... W. Gihon
Spoke holes in metallic wheel felloes, Machine for drilling..... G. H. Everson
Spoke puller, Vehicle..... C. W. Sleeter
Sprayer, Liquid..... L. A. Aspinwall
Spring cushion and its support..... W. H. Bates
Stair rod fastener..... W. Richards
Stamping machine ejecting device..... J. Shirreffs
Starting or stopping mechanism..... G. M. Brous
Steam generator..... W. Sharkie et al
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Steam generator regulator..... T. Clarkson
Steam trap..... F. Tudor
Steamer, Wheat..... J. Frantz
Stencil, Baker's..... L. T. F. Zaiser
Stereoscope..... 2 pats..... H. C. & H. C. White
Stoker, Mechanical..... A. F. Nagle
Stone, Manufacture of artificial sand..... H. Engbert
Stoppers for bottles, jars, &c. Manufacturing..... J. L. Rawbon et al
Stove..... E. G. Germer
Stove and steam cooker, Combined baking..... W. S. James
Stovepipe..... A. Clausding
Stove, Vapor..... J. H. Fink et al
Street sweeper..... A. P. Palmer et al
Sugar, &c. Apparatus for purging..... G. Desanilles
Swing..... G. S. Kerr
Swinging machine..... F. J. McDonnell
Switch operating mechanism..... F. A. Carroll
Syringe, Hypodermic..... J. A. Billings
Tablet, Compressed..... R. M. Whyte
Talking machine..... 2 pats..... L. P. Valiquet
Talking machine cabinet..... H. Sheble
Talking machine record seal..... L. P. Valiquet
Tap for aerated liquids, Drawing off..... S. Young
Tapping jacket..... M. Barrett
Telephone call for party lines..... W. A. Williams et al
Telephone call list..... M. Michaelis
Telephone exchange, Automatic..... N. E. Norstrom
Telephone switch, Intercommunicating..... N. Bassett et al
Telephone system..... C. G. Burke
Telescope..... F. L. Smith et al
Thill coupling..... H. Miles et al
Thread cutting machine..... C. W. James
Ticket delivering device, Coin controlled..... M. Bordier
Tile for roofs, Crest..... S. D. Noel
Tire heater..... S. Gleazen
Tire, Vehicle..... G. A. Weidely
Tire, Vehicle wheel..... C. J. Gilling
Tires, Making rubber..... A. T. Holt
Tobacco from laths, Device for stripping..... F. E. Gullickson
Tool, Convertible machine..... T. F. Timby
Track switch..... S. F. Weaver
Tramway or railway lines, Arrangement for shifting the points of..... G. D. Ross
Trolley rail..... W. N. Haring
Trolley track lock, Overhead..... S. J. Sharp
Truck..... W. H. Laving
Truck loading attachment, Hand..... T. J. Lynch
Tubs, buckets, &c. Machine for sand-finishing..... L. D. Vogel
Turbines, Apparatus for controlling the speed of steam..... G. O. M. Olsson
Type for printing calendars, Set of..... J. L. Carroll
Type justifying machine..... F. H. Holdsworth
Type writer key, Adjustable..... J. B. Hammond
Type writing machines, Transfer or carbon paper for..... H. B. Wilson
Vacuum gage..... I. Patten
Valve, Telescoping..... T. A. Wilkinson
Valve..... J. J. Reilands
Valve, Automatic vent..... L. J. Walsh
Valve gear..... S. I. & W. S. Crain
Valve mechanism..... E. J. Armstrong
Valve mechanism, Cut off..... F. T. Shoemaker
Valve, Rotary..... J. B. Stage
Valve, Safety..... W. S. Washburn
Valve, Steam engine..... A. Tandler
Valve, Steam engine..... E. L. Sauer
Valve, Throttle..... G. W. King
Valve, Throttle..... J. S. Chambers
Vault..... J. W. Donnell
Vehicle driving mechanism, Motor..... C. C. Bramwell
Vehicle mud or sand band..... S. D. & J. M. Horger
Vehicle running gear..... G. H. Sherman
Vehicle speed registering attachment..... G. A. Kennedy
Vehicle storm apron..... W. G. Reese
Vehicle water cooling apparatus, Motor..... E. T. Burrows
Vehicle wheel..... D. H. O'Meara
Vehicle wheel and tire therefor..... L. F. & R. C. Altmeyer
Voting machine..... O. A. Gattrell
Voting machine, Assembly..... F. L. Dyer
Waistband..... L. N. Gross
Wall or fence..... G. Liebau
Water meter..... H. F. Brown
Water wheel..... J. M. King
Weaving diagrams, Producing..... J. Szczepanik
Weed destroying mechanism..... V. Berford
Weeder..... L. D. Yoder
Weighing apparatus..... L. E. Cowey
Weighing machine..... C. J. & A. J. Hartley
Weight and pressure recording apparatus..... E. McGarvey
Well boring apparatus..... J. T. Davis
Wells, Sand reel for oil or Artesian..... H. W. Eaton, Jr., et al
Wheel..... F. M. Canda
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Wheel..... S. Furmidge
Wire straightening and cutting machine..... A. H. Nilson et al
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Yoke center, Neck..... E. C. Summers
Zinc or other volatile metals from ores or mattes Apparatus for obtaining..... 2 pats..... J. Armstrong

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Redstead..... M. V. Hammack
Harness hip strap drop..... A. Mudra
Paper..... G. W. Buskirk

Register face..... C. H. Richards et al
Rug..... E. H. Bennett
Spoon..... S. J. Large
Stove or range..... T. R. Kennedy et al

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Adding machine..... E. Fitch
Air brake..... D. Beemer
Air brake, Automatic..... G. T. Woods
Airship..... H. B. Van Voorhis
Air superheater or carbureter..... H. M. McCall
Album, Loose leaf..... R. F. Obersteuffer
Alpha ionone, Making..... P. Chuit et al
Amalgamating apparatus..... M. Bloume
Antimony, Treatment of ores and materials containing..... J. P. van der Ploeg
Arch support, Brick..... H. B. Strate
Axle..... E. Klein
Axle lubricating attachment, Car..... G. W. Decker
Band cutter and feeder..... P. Swenson
Bar bell..... A. Calvert
Bathing tub..... H. Schulze
Battery grids, Saw for making secondary..... W. Morrison
Battery plates during forming, Means for preventing the distortion of secondary..... W. Morrison
Bean sorting machine feeding device..... A. T. Ferrell
Bed brace..... W. D. Newman
Bed rail..... E. G. Lundquist
Bedstead connecting joint..... J. R. Konetsky
Belt holder..... H. Widdowson
Belt apparatus, Conveyer..... A. M. Acklin
Bicycle..... A. B. Titus
Bicycle fan attachment..... P. E. Hannum
Bicycle package carrier..... T. H. Edmonds
Binder, Temporary..... J. H. Parkes
Binocular glasses..... G. Fecker
Boiler..... J. F. Rose
Bolt lock..... 2 pats..... H. A. Stockman
Book, Deposit credit..... C. T. Inman
Book section having wide and narrow leaves..... A. O. & E. R. Kittredge
Book support..... J. H. Leuba
Bottle for aerated liquids..... D. Tognarini
Bottle, Non refillable..... U. S. Alz
Bottle, Non refillable..... G. Ferguson
Bottle washing machine..... F. X. Spitznagel
Bottle washing machine..... 2 pats..... J. Kayser
Bottles, cans, &c. Top for tooth powder..... H. P. Kent
Bowling alley foot dampener..... S. L. Holden
Bowling alley score board..... J. Paupa et al
Box blank mitering and cornering machine..... E. H. Taylor
Brake apparatus, Fluid pressure..... N. J. Benton
Brake mechanism..... L. Van Cott et al
Braking force, Apparatus for applying and controlling..... H. H. Westinghouse
Brick for storage bin construction..... S. H. Tromanhauser
Brine, Vacuum apparatus for boiling..... G. N. Vis
Brooder..... J. L. Macv
Brush..... S. E. Babcock
Brush..... M. C. Isaacs
Brush, Fountain marking..... J. A. Crandall
Buckle..... D. E. White
Runkle burner..... C. W. Taylor
Bustle and hip form, Combined..... C. H. Scott
Butter cutting machine..... C. Glaus
Button cleaning shield..... S. H. Bascom
Cable terminal..... E. Gonzenbach
Caisson air lock..... W. McIlvrid
Cake pan..... B. Haffner
Camera, Photographic..... 2 pats..... J. E. Thornton
Camera, Photographic..... A. D. Davis
Camera support..... W. A. Marbach
Can heading machine..... F. M. Leavitt
Can opener..... W. C. Meyncke
Cans, Machine for manufacturing soldered..... H. B. Williams
Cane car unloading machine..... H. Froehlich
Cap machine, Hemmed..... L. A. Norton
Carbolster..... S. P. Bush
Carbolster, Railway..... G. C. Murray
Car coupling..... J. A. Chubb
Car coupling..... J. C. Nelson
Car draft beam..... J. K. Evans
Car door fastening, Mining..... J. H. Watt
Car fender..... E. A. Sample
Car tool box, Hand..... L. Larson
Car ventilator..... P. B. Hole
Carbureter..... P. Roemisch et al
Card playing..... K. Frederickson
Carpet fabric, Ingrain..... J. O. McGorman
Carpet stretcher..... F. L. Kidd
Cartridge..... W. E. Hayner
Cartridge loading machine, Metallic..... G. M. Peters
Carving machine..... E. R. Lochman
Cash register..... (reissue)..... R. P. Thompson
Casting apparatus..... H. H. Franklin
Cement, Making..... F. G. Jordan
Chair..... A. J. Morley
Cheese cutter..... E. Niggli
Chemicals in electric furnaces, Producing..... E. R. Taylor
Chock..... R. A. Bockhoop
Cigar exhibiting and vending apparatus, Coin controlled..... D. M. Winans
Cigar or cigarette holder..... C. M. Bragdon
Cigarette machine..... J. C. Hansen-Ellehammer
Cigarette machine..... H. C. Heckendorn
Circuit interrupter, Automatic..... D. M. Moore
Clav, Working..... R. H. Staley
Clock, Electric..... F. Frick
Clothes drying apparatus..... J. Williams
Clutch, Friction..... H. Smith
Coffee pot..... C. E. Ziegler
Coin controlled machine..... W. W. Rosenfield
Coin holder or bank, Pocket..... E. E. English
Collar blanks, &c. Machine for folding..... M. J. Locke
Collar blocking machine, Horse..... J. M. Hjermstad
Combing machine comb..... I. Hey
Combing wool, &c. Machine for..... I. Hey
Commutator segment..... W. H. Widdle
Compass, Binnacle..... J. Paoli
Composition of matter..... G. L. de Lencheres

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Concrete conductor..... W. W. Montgomery
Conveyer..... G. A. Brondet
Conveyer..... M. C. Schwab
Conveyer end support, Spiral..... J. C. Van Arsdell
Conveyer feeding mechanism..... J. M. Dodge et al
Coping machine..... J. T. Zika
Copper water, Precipitant for treatment of..... A. J. Polmester
Cork extractor..... H. H. Ham
Corn husker and fodder shredder..... J. Crosby
Corn shock compressor..... I. B. Tyrone
Corns, &c. Device for removing..... J. F. Allison
Crate, Folding..... C. R. McCullough
Crate, Knockdown..... B. K. Boyd
Cultivator..... M. Shew
Cultivator..... T. S. Warner
Cultivator weeder attachment..... E. P. Clapp
Curd cutter..... J. Lemire
Curtain support, Adjustable window..... C. P. H. Cook
Cushion making machine..... G. Buckman
Cut out, Automatic..... C. P. Steinmetz
Cycles, Clamp particularly adapted for securing fittings to the frames of..... P. B. H. Seabrook
Cycles, motor cars, &c. Brake mechanism for..... G. E. Bennett
Damper, Stove..... W. G. Montgomery
Dental flasks, Closing and locking device for..... D. A. Baker
Dental instruments, Support and switch for electric..... E. O. Pieper
Derrick..... E. E. Weaver
Derrick frame and joint coupling therefor..... J. H. Lohner
Derrick, Portable..... A. Lutz
Detonating composition..... H. von Dahmen
Dipping tank..... G. M. Henderson
Disinfecting apparatus..... C. J. Walz
Dispensing apparatus drip attachment..... G. W. Boyd
Display holder, Necktie..... H. Runtz
Display rack..... G. B. Moore
Display table..... C. A. Shaffer
Door, Folding..... E. H. McCloud
Drag and harrow pulverizer combined..... F. B. Seaver
Drawers foot strap..... M. D. Wilcox
Drawing frame..... J. de Miniszewski
Dredge box..... H. B. Williams
Drill..... H. R. Jacobs
Drill rod grab..... W. W. Campbell
Driving mechanism, Reversible, C. S. Parcells
Dust collecting and settling apparatus..... C. H. Larson
Dust collector..... J. E. Mitchell
Dust guard..... P. Martin
Dye and making same, Black sulfur..... I. Levinstein et al
Dyeing apparatus, Yarn..... J. C. Hamer
Eaves trough miter joint..... T. Rye
Educational device..... F. W. Davenport
Electric light hanger..... L. Poole
Electric meter..... E. Thomson
Electric motor..... H. Rowntree
Electric motors, Automatic controller for..... N. A. Christensen
Electric switch..... J. J. Flint
Electric tube lighting..... 5 pats..... D. M. Moore
Electrical controlling apparatus..... R. F. Platt
Electricity meter..... E. G. Holm
Electrodes, Forming secondary battery..... W. Morrison
Elevator guard..... I. I. Fonda
Elevator locking device..... M. R. Muckle, Jr.
Elevator or storage house construction..... S. H. Tromanhauser
Elliptical spring..... H. C. Swan
Embossing machine..... I. Clapper
End gate and fastening therefor..... L. F. Fredericks
End gate, Wagon..... N. Hon
Engines, Regulation of speed and power..... E. Thomson
Envelop..... A. F. Callahan
Envelop..... D. H. Keller
Eyelet..... I. W. Giles
Fabric cutting machine..... H. A. Meyer
Fan motor attachment..... W. S. Moody
Fastener, Expansion..... E. J. McCormick
Fastening device..... C. D. Hancock
Faucet, Filter..... J. F. Ryan et al
Fence post..... J. A. Mitchell
Fibers or filaments from solutions of cellulose, &c., and for twisting and putting into coil form such or other fibers or filaments, Apparatus for the production of textile..... C. F. Topham
Filtering press..... K. Ensinger
Fire escape..... O. Tardif
Fireman's shield..... F. W. Sheppard
Fireproof building structure..... J. O. Ellinger
Fire starter or gas heater..... T. B. Draper et al
Fish drying apparatus..... A. A. Morris
Flies from cattle and trapping same, Device for brushing..... O. B. Gibson
Fine cutter attachment..... I. C. Hicks
Fluid pressure brake..... H. H. Westinghouse
Flushing tank, Closet..... L. F. Haynes
Folding machine..... L. E. Barnes
Folding stand or easel..... J. A. Scott
Forts, Construction of..... P. J. Nelson
Furnace terminal, Electric..... E. G. Acheson
Furniture, Combination..... J. Moran
Furniture door slide or guide..... F. L. Forster
Game or puzzle..... J. H. Bennett et al
Game table..... P. W. Cameron
Garment supporter..... P. Douglas
Gas apparatus, Acetylene..... A. W. Edwards
Gas engine..... F. L. Nichols
Gas furnace, Steam boiler..... E. J. Duff
Gas generator, Acetylene..... A. Davis
Gas lighting device..... G. Meier
Gas lighting or extinguishing device..... V. Forti
Gas line safety device..... J. C. Furman
Gas, Purifying acetylene..... J. A. Burgess
Gas regulator..... S. L. McAdams
Gate..... H. M. Lockett
Gate..... C. B. Johnson
Gearing, Variable speed..... F. W. Gordon
Gem grinding and polishing apparatus..... F. E. Hilliard
Girth fastening, Saddle..... C. I. Bush
Glass by electrical heating, Manufacture of..... A. Voelker
Glass cutter..... W. L. Barrett
Glass, Drawing..... 2 pats..... J. H. Lubbers
Glass drawing apparatus..... 3 pats..... J. H. Lubbers

Glasses. Lens fastening for.....H. H. Waugh
Glazing machine. Automatic.....B. C. Hemming
Golf tee.....C. E. Stockder, Jr
Grain bluder.....J. L. Ware
Grain cleaner blast regulator.....A. T. Ferrell
Grain cleaning machine brush attachment.....
A. T. Ferrell
Grain drier.....J. P. Churchill
Grain drill seed tube.....J. W. Poindexter
Grain elevator for separators.....S. B. Hart
Grain separating machine.....W. L. Belt
Grate. Tilting water.....H. D. Sawyer
Gravity lock.....D. J. Kennedy
Gravity motor.....W. O. Benner
Gun. Automatic.....A. Noble
Gun cleaning tool.....A. H. Durston
Gun tower. Armored.....R. Geelhaar
Hail preventing device.....D. Maggiora et al
Hand wheel.....E. H. Seddon
Harrow clearing attachment.....N. Paulsen
Harvester. Clover.....A. D. Miller
Harvester, husker, and loader. Combined corn
.....J. E. Larson
Heating and metal rolling. System for contin-
uous.....T. V. Allis
Heating apparatus.....M. M. Johnson
Heating apparatus. Steam.....C. H. Atkins
Heating systems. Fitting for steam C. A. Ball
Heel. Boot or shoe.....J. H. Jackson
Hinge.....E. M. Hulse et al
Hinge joint for connecting rod sections.....
F. A. E. Hamilton
Hitching post.....J. A. Taylor
Hoisting and conveying machine.....S. Jackson
Hoop lug.....R. B. Moore
Horseshoe.....E. B. Fisk
Hydraulic testing machines. Automatic gage
for.....W. Hurrell
Ice machine press.....D. L. Holden
Indicating instrument.....L. T. Robinson
Induction apparatus.....W. Scheidel
Inhaler.....E. M. Morgan
Insulating handle connection.....G. Brabrook
Insulator.....2 pats.....V. G. Converse
Internal combustion engine.....C. W. Kelsey
Internal combustion engine.....J. S. Rogers
Invalid reclining chair.....I. W. Amerman et al
Iron or steel. Removing scale oxid from the
surface of.....A. K. Eaton
Ironing board.....C. W. Parsons et al
Ironing board.....M. Oniel
Journal box.....J. F. Schumacher
Jumper fob.....E. R. Mead
Keir for bleaching, &c. W. W. L. Lishman et al
Kettle.....L. Gilleran
Kneader. Dough.....M. J. Russell
Label.....G. E. Howard
Labels. Machine for inserting and fastening
strings in.....S. B. Tily et al
Lamp burner.....S. B. Morss
Lamp. Electric tube.....2 pats.....D. M. Moore
Lamp. Gas.....T. Maguire
Lamp glower and making same. Pyroelectric
.....C. P. Steinmetz
Lamp holder. Electric incandescent.....
E. G. Sheppard
Lap robe.....J. T. Forster
Latch.....G. H. Pierce
Latch.....A. Charles
Leather stretching machine.....J. Caldwell
Leather working machine.....J. K. Miller
Line grip.....F. L. Ferre
Linotype machine.....2 pats.....J. B. Bell
Liquid pressure regulator.....M. Pink
Liquid tanks. Device for charging or discharg-
ing.....S. W. Miller
Lock.....M. Schrauder
Locks. Extension cylinder for pin.....
A. Cramond
Locomotive draft regulator.....O. Horenz
Loom fabric scouring attachment.....P. Spindler
Loom shipper mechanism.....C. M. Day
Loom shuttle.....C. N. Brown
Loom thread parting mechanism.....C. F. Roper
Looms. Means for defuiling the beat of the lay
of.....C. H. Warren
Looms. Tuft yarn spool for tufted pile fabric
.....J. F. Riddell
Magnet holding and adjusting apparatus for
compensating binnacles.....A. M. Ritchie
Mail box.....S. A. Jones
Mat cutter.....C. Arnold
Mattress.....D. Frankenthal
Measure. Lumber.....J. Greene
Measuring apparatus. Liquid.....J. Marchbank et al
Measuring case.....A. R. & H. G. Wormwood
Mechanical movement.....J. D. A. Johnson
Merchandise transfer apparatus.....A. W. Swanitz
Metallic sulfids soluble. Rendering.....C. G. Collins
Metallurgical filter.....F. H. Long
Milk cooler.....W. L. Haley
Milkier. Cow.....D. Y. Wilson
Mines. Machine for extracting coal in pieces
from.....C. Wissemann
Mining machine.....J. M. McHugh
Mitering machine.....J. T. Zika
Mitten.....C. C. Pratt
Moistener. Stamp and envelop.....C. W. Millar
Mold flask partition.....H. W. Bell
Molding press.....J. F. Buckley
Mopping device.....H. F. Ackerman
Mosaic work. Making.....J. S. Parker
Motion. Apparatus for converting rotary into
reciprocating.....R. H. Yale
Motor.....W. Dieter et al
Motor driven device or mechanism.....
H. A. Meyer
Motor shut off device.....T. D. Miller
Muffler.....A. G. Ronan
Musical instrument.....H. Langfelder
Mussels. Drag for gathering.....J. W. Sharp
Nitroglycerin. Apparatus for the manufacture
of.....F. L. Nathan et al
Nut lock and key.....J. F. Fierke
Nut wrench.....C. C. Smith
Oil burner.....A. Johnson
Oil burner.....J. B. Payne
Oil burner. Crude.....T. E. Lewis et al
Oil can.....W. J. Paul
Oil cup.....J. B. L. McKenzie
Oils and products produced thereby. Effecting
the drying of non drying.....W. N. Blakeman, Jr
Ore concentrator.....W. G. Dodd
Ore roaster.....J. L. Hopper
Ore separator and classifier.....C. Culver
Ore separator. Magnetic.....J. W. Carter
Oxidizing apparatus.....A. N. Dubois

Oyster tongs.....M. Lawrence
Package for grain products.....T. F. Wales
Package. Shipping.....F. W. Collins
Paint compound or mixture.....W. N. Blakeman, Jr
Paints. Manufacturing.....W. N. Blakeman, Jr
Paper box machinery. Creasing or scoring
and mitering mechanism for.....C. W. Gay
Paper hanger's tool.....T. E. Boord
Paper. Making.....J. B. Hanscom
Paper pulp, &c. Bleaching.....F. H. Long
Peat press.....A. A. Dickson
Photometric recorder and indicator.....J. Poliakoff
Piano. Pneumatic.....S. K. Reynolds
Pigment and producing same.....W. N. Blakeman, Jr
Pigments and products produced thereby.
Treating.....W. N. Blakeman, Jr
Pigments for paints. Treating.....W. N. Blakeman, Jr
Pigments. Imparting drying properties to.....
W. N. Blakeman, Jr
Pillow sham holder.....M. A. Yenner
Pipe.....T. M. Saurman
Pipe fittings or joints. Non conducting cover-
ing for.....J. W. Farley
Pipe wrench.....G. H. Swarthout
Pipe wrench.....J. F. Stemper
Plaiting machine roll.....D. L. Chandler
Planing machine.....W. W. Carey
Planter.....A. J. Owens
Plow attachment. Disk.....F. M. Mecum
Plumb bob.....H. M. Curry
Pneumatic despatch system.....H. W. Forslund
Pneumatic transfer tube system.....F. W. Jones
Pool games, &c. Combined frame and register
for.....E. R. Marshall
Post hole digger.....D. A. Bowen
Power transmitting mechanism.....A. T. Brown
Precious metals from their ores. Extracting.....
E. D. Kendall
Printing machine.....E. Lee
Printing machine. Blue.....C. Spaulding
Propeller controller.....W. Cooper
Pump.....A. Radovanovic
Pump pipe grapple.....L. N. & S. H. Schulte
Pump valve. Vacuum.....W. F. Garrison
Punch. Pocket knife leather.....O. L. Harrison
Puzzle.....J. Elliott
Puzzle.....M. Cody
Quilting frame.....T. Lewis
Radiator valve actuating mechanism.....W. P. Clough
Rail joint.....E. P. & H. C. Hunter
Rail joint and tie plate. Combined.....T. Cosgrove
Railway clearing house.....A. W. Swantz
Railway construction.....G. L. de Lencheres
Railway switch.....L. Palmer
Railway track sanding device.....A. C. Monfort
Railway train guard. Antitelescoping.....2 pats
.....W. B. Heyburn
Range and water heater. Combined.....
H. W. Conner
Receptacle for holding and delivering aromatic
substances.....E. O. Witman
Refrigerating apparatus.....E. W. Howell
Register.....B. G. Robbins
Registering device. Automatic.....R. R. Spears
Rein holder.....T. Keeper
Rein support.....S. E. Harsh
Retort.....E. H. Hopkins
Rocking and reclining chair. Adjustable.....
J. M. Roberts
Rolling machinery.....E. W. Hopkins
Rope clasp.....W. N. Hull
Runaways. Device for arresting.....F. E. Arnold
Sad iron handle.....C. T. Demarest
Safety pin.....G. W. Light
Sanding machine.....O. S. Hammond
Sash fastener. Detachable window.....A. L. Darr
Sash lock.....J. H. Thornton
Saw clamp.....W. I. Kirk
Saw sharpening device.....O. E. Peiseler
Sawing machine. Automatic cut off.....W. M. Dwight
Scale. Spring balance.....J. L. Mauldin
Scissors or shears.....D. McKenna
Screw bolts, &c. Apparatus for extracting.....
P. L. Senn
Screw driver.....E. G. Rowlands
Sealing implement.....H. W. Abbott
Secondary battery.....W. Morrison
Sewage disposal plant.....G. H. Anderson et al
Sewing machine.....A. W. Eaton
Sewing machine. Button.....A. Giacomini
Sewing machine table and guard attachment
combined.....E. H. Ahrens
Shade bracket. Automatic extension.....A. H. Ousley
Shaft support and coupling. Combined.....
H. Harden
Sheet metal dish or cap feeding machine. Auto-
matic.....J. F. Wing
Sheet metal folded joints. Machine for the
production of.....T. L. Carbone
Shoe fastener.....D. M. Kinnear et al
Shoe polisher.....E. De Baun
Shoe turning device.....G. B. Gardner
Shovel.....J. F. Haviland
Show case.....A. Jaeger
Shutter. Window.....J. L. Nettleton
Sifter spout. Flour.....H. R. Roberts
Signs. Switchboard for illuminating electric
lamp.....M. Norden et al
Skate clamp.....J. H. Morrison
Sled.....A. F. Lagerstrom
Smoothing iron.....B. F. Albaugh
Soda water apparatus.....R. M. & R. M. Green, Jr
Soda water apparatus. Syrup cock for.....
R. M. Green, Jr
Soldering machine. Side seam.....H. B. Williams
Speed of vehicles. Instrument for indicating
and recording the.....J. Nutry
Spinning artificial silk filaments for forming
strands or threads. Apparatus for.....
R. W. Strehlenert
Sponge substitutes. Forming.....A. Straus
Spur. Riding.....C. W. Davison
Stamp affixer.....B. H. Calkin
Stamp. Time.....S. G. Miller
Staple forming and driving mechanism.....W. Edge
Starting or stopping mechanism.....A. Giacomini
Steam. Controlling the generation of.....
C. & A. Musker et al
Steam generator.....J. J. Kilshaw
Stone surfaces. Machine for working.....T. Stigliz
Storage battery.....A. D. Edgerton

Store service apparatus.....M. C. Swezey
Stove, range, &c.....F. Anshutz
Strap grip for snaffling horses, &c.....J. H. Wallace
Stroke regulator.....R. H. Yale
Surveying instrument.....J. Beal
Switch or outlet box. Adjustable.....J. H. Rusby
Switch throwing device.....C. C. James
Switch throwing device. Locomotor.....A. C. Wolfe
Synchronizing alternators.....R. E. Huthstener
Synchronous motion to distant points. Means
for transmitting.....L. Saxon
Syringe box. Fountain.....A. C. Eggers
Syrup cooling apparatus.....W. Walter
Table.....H. M. Hanson
Taps. Device for removing broken.....J. Kinvall
Telegraphic apparatus.....S. G. Brown
Telegraphic transmitter. Automatic.....J. A. Toomey
Telephone switchboard.....J. M. Overshiner
Telescope.....A. A. Common
Tennis net. Table.....J. H. & W. C. Quiggin
Test cup.....W. W. Emmons
Thermometer. Clinical.....J. F. Windolph et al
Thill. Vehicle.....H. G. Brough
Threshing machine.....G. R. Davies
Threshing machine band cutter.....G. F. Conner
Ticket holder.....A. S. Adams
Ticket holder. Theater or transportation.....
E. O. Loomis
Tile. Building.....E. S. Lafferty
Tile. Roofing.....A. Gustorf
Tilting gate.....B. A. Fisher
Timepiece. Geographical.....C. E. Davis
Tire. Elastic.....W. F. Williams
Tobacco cutter.....W. W. Watson
Tobacco, &c. Extractor for plug.....A. J. Feild
Tobacco. Manufactured.....W. A. Fretwell
Tobacco steamer.....C. M. Armstrong
Tobacco stringing machine.....C. G. Wells
Tongue support.....S. Ebersole
Tool handle.....E. Ewing
Tooth crown. Artificial.....J. C. Osborne
Toy. Explodable paper.....M. T. Lynch et al
Trace carrier.....W. E. Dippert
Train pipe coupling.....G. L. Bonham
Trolley crossover.....T. North
Trowel grinding machine.....H. Beltz
Truck. Friction driven.....J. F. McElroy
Trunk or package binder.....C. C. P. McCord
Truss. Hernial.....M. R. Smyth
Tube drawing grip.....E. W. Samen
Tube machine.....J. J. Garrity
Tubing. Manufacture of bent.....J. P. Buckley
Tumbling barrel. Sand blast.....B. C. Tilghman, Jr
Turbine. Steam.....(reissue).....J. Burgum
Type distributing machine.....P. E. Hodgkin et al
Type writing machine word counting attach-
ment.....H. B. Cary
Unloading scows, &c. Apparatus for.....T. P. Payne
Valve.....E. Webb
Valve.....J. W. Nethery
Valve. Check or pump.....R. Kreher
Valve. Engineer's.....N. A. Christensen
Valve for internal combustion engines. Ex-
haust.....J. Saltar, Jr
Valve for steam passages. Water and air
relief.....C. H. Atkins
Valve governing mechanism for engines. Inlet
.....J. F. Duryea
Valve regulator and governor.....J. F. McElroy
Valve. Relief.....F. Schreidt
Valve. Stop.....W. G. Tyson
Vehicle.....J. F. Hathaway
Vehicle brake.....W. A. Critchlow
Vehicle. Motor.....J. D. Maxwell
Veil fastener.....A. Bippart
Vending machine.....J. C. de Janisch
Ventilated box.....L. D. Lewis
Wagon.....S. D. Reynolds
Wagon. Chute.....E. L. Keyes
Wash tub.....F. C. Kainer
Washing machine.....D. Boorman et al
Watch dial.....W. Brack
Water meter. Disk.....2 pats.....W. H. Larrabee
Water meter. Disk.....F. L. Northrop
Waterproof coat.....G. A. & A. Strom
Water wheel.....S. Shultz
Weather strip.....B. M. Whiting
Well casing and strainer.....J. G. Huffman
Well casing perforating device.....T. E. Clark
Wheat cleaning mechanism.....J. Higginbottom
Windmill.....G. B. Snow
Winding machine conical tube holder.....C. E. Riley
Window lock.....S. J. Gibboney
Window screen.....J. H. Rankin
Window screen.....M. R. Skinner
Window screen. Adjustable.....D. E. Fleming
Wire stretcher.....H. L. Ferris
Woodworking machine holddown device.....J. R. Thomas
Wrench.....F. C. Peabody
Wrench.....W. Shirk
Writing attachment.....J. C. Fink
Writing machine carriage.....J. T. Schaaff

DESIGNS.

Badge.....J. B. Nolin
Box. Paper.....R. L. Myers
Bureau or similar article.....M. V. Hammack
Bureau or similar article of furniture.....M. V. Hammack
Calendar.....H. Doyle
Clock case.....P. Tietgens
Cup.....S. Linz
Floor covering. Mosaic.....E. D. Weary
Monument.....E. M. Wolff
Name plate.....W. D. Hamilton
Picture frame.....M. V. Hammack
Scale base.....O. O. Ozias
Sideboard or similar article.....M. V. Hammack
Stone. Cut.....2 pats.....E. G. H. Schneck
Trimming.....G. H. Taylor
Type. Font of printing.....E. Everard
Vehicle body.....W. S. Rogers

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ing.....W. N. Best
Air brake testing apparatus.....G. N. Saum et al
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Applicator and syringe. Combined.....L. J. Loblein
Axle attachment. Vehicle.....J. W. Hafer
Badge medallion.....J. E. Miller
Bag holder.....J. P. Adams
Balance or scale. Automatic.....E. G. Hedman
Baling press.....F. M. Chappell
Ball pitcher. Mechanical base.....C. Edwards
Basket or bucket. Folding.....R. H. Hazen
Bearing.....J. N. Everett
Bed.....4 pats.....L. N. Bachand
Bed and wardrobe. Folding.....C. J. Weiss
Bed bottom.....P. R. Rooney
Bed. Davenport.....L. N. Bachand
Bed pan.....E. A. Stockdale
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Bedstead.....C. B. & F. White
Bedstead grate.....A. Brecht
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Bicycle construction.....J. C. Pratt
Bicycle seat post clamp.....J. H. Rast
Bicycle support.....E. Moss
Bicycle wheel carrier.....C. R. Smith
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Block signal system.....P. O. Keilholtz
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Boat. Life.....L. Brown
Boat. Submarine.....2 pats.....J. P. Holland
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Boiler or other furnace. Steam.....W. F. Wilmoth
Boiler setting.....E. R. Eddis
Bolster.....E. W. Palmquist
Bookbinder's press punch.....P. A. Bowen
Book holder.....E. S. Antisdale
Books. Making.....A. R. Dressel
Boot or shoe.....F. W. Slater
Bottle capping machine.....J. H. Fox
Bottle. Non-refillable.....F. J. Bracconier
Bottle. Non-refillable.....S. J. Daykin
Box fastener.....J. H. S. Johnson
Brake mechanism.....P. J. McCullough
Brake shoe.....A. L. Streeter
Brick molds. Safety appliance for sanding
and feeding.....H. Schoonmaker
Bronzing machine.....G. Hare
Brush.....J. F. Bowditch
Brushes, brooms, &c. Apparatus for attach-
ing or detaching handles of.....J. Elstone
Bucket dumping device for steam shovels.....
H. T. Porter et al
Bulkhead door.....W. W. Iffe
Burial robe.....H. K. Burket
Cake dropping apparatus. Cup.....W. J. Meikleham
Camera. Photographic.....C. F. J. Niss
Camera stand.....J. H. Smith
Canceling machine. Stamp.....G. R. Sherwood
Caue conveyor. Sugar.....C. H. McNally
Car bolster.....H. C. Buhoup
Car door. Sliding.....J. Player
Car fender.....W. B. Rohmer
Car loader. Box.....D. A. Chappell
Car route indicator.....M. O. Parenteau
Car side bearing. Railway.....C. H. Williams, Jr
Car. Stock.....J. F. Clark
Car wheel.....M. P. Gerbing
Carbid cartridge.....E. M. Rosenbluth
Carbon holder.....S. B. Whinery
Carbonator. Beverage.....J. H. Fox
Carburetor.....M. S. Deringer
Carburetor. Explosive engine.....J. W. Parkin
Cartridge clip.....E. G. Parkhurst
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Casket handle attachment.....H. Riegel
Centrifugal separator.....P. L. Kimball
Centrifugal separator.....I. V. Holmes
Chain.....L. D. Howard
Chain protection. Driving.....E. Catchpool
Chain retaining and releasing means.....
J. J. Galway
Chair.....H. W. Bolens
Chair attachment. Rocking.....D. F. Clifford
Chair spider.....H. W. Bolens
Chimney cap. Revolving.....A. E. & F. J. Cook
Cigar lighter.....W. F. Kessler
Cigar lighter. Electric.....W. F. Kessler
Clamp.....J. Fellows
Clasp.....C. A. Bryant
Clip.....P. H. Yawman
Clock. Electric program.....J. O. Lyman
Clock movements for starting or stopping ma-
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Clock synchronizer. Electric.....C. F. Mears
Cloth cutter.....S. Geczyuski
Cloth, &c. Device for unrolling.....H. L. Rosenthal
Clothes pounder.....S. B. Tadlock
Coal crusher.....A. W. F. Steckel
Coal, &c. Machine for washing.....F. R. Wilson, Jr
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Collection form.....A. F. Sanford
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Concrete mixing machine.....C. Otis
Conveyer.....J. H. Cook
Conveyer.....A. J. Webster
Cooker and turner. Cake.....H. W. Arner et al
Cooking apparatus. Steam.....W. C. Salmon
Copper ores. Apparatus for treating.....R. Seaman
Corn husking machine.....W. H. Gernand
Corn shocker.....J. F. Steward
Corset steel, &c. Socket for.....N. F. T. Hunt
Cot and tent. Combiud folding.....D. I. Kulu
Cranberry assorting apparatus.....A. E. Nightingale
Crate for poultry. Folding.....A. F. Dice
Curtain fixture.....J. Burley
Curtain hanger.....A. F. Goshorn
Curtain or shade fixture.....F. E. Sircolomb
Curtain pole.....L. J. Graff
Curtain rod.....M. P. Creahan
Dental appliance.....H. E. Ludas
Dental bridgework. Securing device for.....
W. E. Griswold
Dental fastening and bridgework.....W. E. Griswold
Dental impression cup.....W. E. Griswold
Dental tool.....W. E. Griswold
Dilator.....C. G. Gibson
Display tray. Jewelry.....J. P. Angell
Dock. Land reclaiming.....E. Chaquette
Dogging machine. Steam.....A. S. Hill
Door strike.....E. Bommer
Drawer support.....F. O. Anderson

Draft rigging. Combined friction and direct
 Drafting spring. J. J. Hennessey
 Dredge. Clam. 2 pats. E. Chaquette
 Dredge. Floating. E. Chaquette
 Dress shield. J. F. Murphy
 Dress supporter. R. F. Montgomery
 Ear drum. Artificial. U. Kleiner
 Egg tray. W. Darling
 Electric battery. P. Delafon
 Electric conducting wire. H. & E. Hammesfahr
 Electric generator. Dynamo. B. G. Lamme
 Electric maximum demand indicator. A. Wright
 Electric meter. Maximum and minimum re-
 cording. A. Wright
 Electric motor speed regulating means. B. G. Lamme
 Electric synchronous apparatus. 3 pats. W. M. Miner
 Electric wires or cables. Conduit for. 2 pats. R. W. Lyle
 Electrical machine collector ring. R. Siegfried
 Electricity meter. 2 pats. A. Wright
 Electricity meter. Direct or continuous current
 Electricity meter of the electrolytic type. A. Wright
 Electricity metering. A. Wright
 Electrochemical generator. H. S. Amwake
 Electrodes. Graphitizing. E. G. Acheson
 Embalming and cooling board. J. A. Turney et al
 Engine controlling mechanism. O. F. Dannenberg et al
 Engines. Means for facilitating the starting
 of gas or similar. J. Hutchings
 Envelop and advertising opener therefor. F. Theilengerd
 Escutcheon and paint protector. Combined
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 Eyeglass case. W. Zoerb et al
 Fabrics. Reserve and discharge on textile. E. Knecht
 Faucet. F. P. Sparmaker
 Feed trough. J. M. Allen
 Feeding device. Automatic proportional. L. Serpollet
 Fence post, telegraph pole, &c. I. M. Warner
 Filter. V. Oster
 Filter. D. E. Shinn
 Filter. Oil. T. Neuray
 Firearm. Revolving. J. H. Wesson
 Fire escape. B. F. Hendricks et al
 Fireman's mask. J. B. Reid
 Fires in closed compartments. Apparatus for
 extinguishing. H. B. Febiger
 Fires in closed compartments. Extinguishing
 H. B. Febiger
 Floor construction. W. H. Barrar
 Floor jack. R. J. Wetland
 Floor rubber. C. F. Lemcke
 Fluid pressure coupling. W. H. Simmons
 Fluid pressure engine. R. C. Sayer
 Fluid pressure engine. A. C. Smith
 Fluid pressure regulator. P. H. Hamilton
 Fly paper holder. C. D. Eaton et al
 Fruit box. W. Clement
 Fruit jar. H. B. Burns
 Furnace. W. F. Wilmoth
 Furniture coupling. J. Brunner et al
 Fusible materials to dust. Apparatus for re-
 ducing. A. F. Madden
 Game or puzzle. J. Putnam
 Garment fastener. G. W. Gwin
 Garment hanger. J. Black
 Garment supporter. H. N. Northrop
 Gas burner. T. Holland
 Gas burner. Incandescent. C. W. Taylor
 Gas generating and burning furnace. C. M. Gearing
 Gas generator. Acetylene. D. H. Treichler
 Gas generator. Acetylene. J. D. Buckley et al
 Gas producing apparatus. T. H. Muller
 Gear. Elliptic chain driving. 2 pats. W. F. Williams
 Gearing. Differential. C. H. O. Hamann
 Glass cutter. Circular. D. B. Johnson
 Glass glazing apparatus. T. Coleman, Jr
 Glass to molds. Mechanism for feeding. T. Coleman, Jr
 Gold separator. C. W. Gardner
 Golf practice apparatus. A. B. Smith
 Grain drill furrow opener. Disk. R. H. Schlachter
 Grain spout. B. Kienholz
 Grate bar. H. E. Parson
 Grate bar. H. Truesdell
 Grate for automatic stoking. Inclined. H. H. Campbell
 Grinding machine. W. H. Fetters
 Grinding machine. Drill. C. Ridderhof
 Grinding mill. Ball. M. F. Abbe
 Gun breech mechanism. L. N. D. Mixsell
 Gun. Water. C. H. Radcliffe
 Hand guard and wrist supporter. G. L. Pierce
 Harrow. W. Powers
 Harvester. Bean. J. H. Stanton
 Hasp fastener. A. Voight
 Hat brim trimmer. J. R. Griffith et al
 Hay on wagons. Device for binding. J. H. Winterowd
 Heating furnace. W. Gorman
 Hinge. F. Dyer
 Hinge. Spring. W. A. Skinner
 Hoe. E. C. Lewis
 Hoisting apparatus brake. H. Votsch
 Hoop nailing horse. Lining. W. J. Ott
 Horses' feet. Antislipping pad for. T. F. Hayes
 Hose adapted for coupling, &c. Flexible. M. Montgomery
 Hosiery with lacework stripes. Manufacture
 of seamless. W. Wilson
 Hub. Vehicle. J. E. Foley
 Hydraulic jack. W. K. Stansbury
 Hydrocarbon burner. A. Mende
 Hydrocarbon burner. Retort. A. D. Duncan et al
 Hydrocarbon lighting system. F. A. & R. D. Cody
 Hydrocarbon vapor burner. L. G. Heist
 Hydrogen chlorid and sodium sulfate. Making
 Insulator and manufacturing same. F. M. Locke

Insulators. Making. F. M. Locke
 Internal combustion engine. J. F. Hobart
 Jar closure. F. E. Dopheide
 Joist bridging. C. O. Nelson
 Journal box. G. A. Woodman
 Journal box lid. G. A. Woodman
 Journal box lid. Dust proof. G. A. Woodman
 Ladder. Step. A. Mau et al
 Lamp. Carriage. E. M. Rosenbluth
 Lamp circuit and cut out. Electric arc. M. H. Baker
 Lamp. Inclosed arc. W. L. Cheney et al
 Lamp reflector shade. Electric arc. W. E. Goldsborough
 Lawn sprinkler. H. H. Gray
 Leather. Stretching. J. Caldwell
 Leather surface. Finishing. C. J. Miller
 Lens, &c. Spring clamp for. E. L. Lemcke
 Letter box attachment. C. H. Tracy et al
 Linotype machine. 3 pats. P. T. Dodge
 Liquid fuel burner. J. W. Neumann
 Loom filling replenishing mechanism. G. F. Hutchins
 Loom for weaving bordered fabrics. G. W. Cammock et al
 Loom shuttle. I. F. Peck
 Loom shuttle. N. Caisse
 Loom warp stop motion. H. J. Jarry
 Looms. Mechanical warp stop motion for. H. Wyman
 Mail box. J. M. Reasoner
 Malt kiln. T. Haynes, Jr
 Mangle. W. E. Andree
 Massage machine. C. Pfanschmidt et al
 Match machines. Power transmitting device
 for. T. W. Synnot
 Measure. Oil. G. E. Bernard
 Mechanical movement. B. Ivor
 Metal bending machine guide. C. Weber
 Metal surfaces. Producing designs or delinea-
 tions on. R. F. Bartle et al
 Metals from ores. Recovering. J. W. Neill et al
 Mining machine truck. A. Palmros
 Mirror. Bicycle. P. A. Aurness
 Molds. Chaplet for supporting cores in. W. A. Bole
 Mosaic blocks. Die for cutting. W. A. Arnold
 Motor. H. de Chardonnet
 Motor generator. P. J. Collins
 Motors. Cooling attachment for internal com-
 bustion. F. Thourot
 Mowing machine finger bar adjusting device. C. G. Hunter
 Mowing machine gearing. W. A. Kirby
 Multiple switch. H. H. Cutler
 Music sheet perforating apparatus. H. M. Salyer
 Musical instrument. Automatic stringed. F. W. Wood et al
 Mustache guard. E. C. Gladwin
 Nail clipper. Right and left. H. Wilcox
 Necktie fastener. I. S. Altman
 Newspaper holder. J. Willon
 Nut and oil cap for wheels. Combined axle. A. C. Atkin
 Nut cracking machine. A. Gerstmayr
 Nut lock. C. W. Faist, Jr
 Nut lock. T. C. Bornman
 Oil burner. W. R. Jeavons
 Oil feeder. L. G. Nilson
 Oil tank. J. J. Paquette
 Opera chair. Folding. A. R. Milner
 Ore concentrator. L. Cohen et al
 Ore elevator. H. A. Vezin
 Ore pocket. F. K. Hoover et al
 Oxygen generating retort. F. B. Felt
 Package for fragile articles. H. C. Lord
 Packing. Rod. T. W. Mitchell
 Panel raiser. L. S. Depoe
 Paper feed mechanism. F. M. Peters et al
 Parer and cutter. G. Giovanna
 Penholder. R. L. McNiece
 Photographic film protecting strip. W. F. Maulick
 Photographic plate for reproducing ink im-
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 Piers, &c. Shifting device for. W. D. Baldwin et al
 Pile or nap fabrics. Apparatus for producing
 J. Eaton
 Pillow sham holder. T. Bambauer
 Pipe connection. G. F. Ryan
 Pipes, &c. Hanger for. A. B. Carll
 Planter grain ejector. Corn. A. J. Marshall
 Planter marker. Seed. N. E. Schoonover
 Planter. Seed. E. L. Caraway
 Playing ball. E. Kempshall
 Pliers. I. A. Coon
 Plow attachment. W. G. Hall
 Plow attachment. Combination. W. A. Jeffers
 Pocket closure. J. H. Syme
 Powder filling and folding machine. F. A. Robinson
 Powder filling and wrapping machine. F. A. Robinson
 Power from car axles. Means for transmit-
 ting. E. H. Johnson
 Printing and embossing press. Plate. W. Fullard
 Printing press. A. E. Dowell
 Printing press driving means. S. G. Goss
 Projectile. A. W. Mattson
 Pulp washing apparatus. A. Hinzke
 Pulverizer. Land. H. Howe
 Pump. J. W. Reynolds
 Pump and bailer. Sand. W. E. Johnston
 Pump and bailer. Sand. F. W. Jackson
 Pump. Centrifugal (reissue). W. S. Sharpneck
 Pump motor. P. S. Woods
 Pumping apparatus. J. W. Simmons
 Puzzle. G. F. Barden
 Radiator. C. W. Rogers
 Rail. Compound truss. E. T. Morlan
 Rail joint. W. A. Paine
 Rail joint. C. D. Jones
 Rails, bars, &c. Mechanism for straighten-
 ing. C. E. White
 Railway coupling apparatus. W. R. S. Jones
 Railway. Electric. J. C. Henry
 Railway points or switches. Safety device for
 S. Rogozza
 Railway replacing frog. A. Pursley
 Railway switch. W. C. Wood
 Railway switch. S. A. Douglas et al
 Railway tie. Metallic. C. Buhrer
 Range finding and surveying instrument. J. Waddell
 Range. Gas. W. D. Hutson
 Ratchet mechanism. A. Van Wagenen
 Ratchet wrench. D. B. Arnold
 Razor strop. W. O. Britton

Reclining chair. J. W. & E. A. Clark
 Rein support. J. T. Smith
 Retort rakes. Making. G. M. Portman
 Revolver. H. M. Kolb et al
 Road roller. Steam. T. Wright
 Rock drill. Hand. V. Y. Smith
 Roof covering sheet. W. H. Bache
 Roost. Poultry. J. H. F. Eversz
 Rotary engine. J. A. Porter
 Rotary engine. C. A. & O. W. Hult
 Rotary engine. W. L. Casaday
 Rotary engine. P. Phillip
 Rotary engine. E. F. Pickett
 Rubber dam holder. E. N. Beall
 Sad iron. H. Grabin
 Safe. C. V. Peckham
 Sanitary receptacle and cesspool. J. F. McCoy et al
 Sash cord fastener. E. L. Blackman
 Sash fastener. R. D. Logan
 Sash fastener or holder. J. W. Cade
 Sash locking mechanism. J. A. Brooks et al
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 Saving machine. Gang edger. A. E. Roe
 Scale. Automatic weighing. N. Nilson
 Scraper. Roller. R. Lucas
 Screens. Means for hanging. C. Rowland
 Screw guard. Set. D. W. Bender
 Scrubber and mop. Combined. C. J. Hunt
 Seam for uniting fabrics. S. Arnold
 Seed drill. A. Chaplin
 Seed hulls. Treatment of cotton. J. C. W. Stanley
 Seeding machine. J. H. Samuels
 Sewed articles. Seam for. C. McNeil
 Sewing machine folding guide. C. L. Weatherwax
 Sewing machine thread cutting mechanism. R. W. Thomson
 Shade bracket. E. M. Winfrey
 Shade holder. A. McKenzie
 Shock loading apparatus. A. C. Houdysheill
 Shoe fastening. A. G. Mead
 Shoe protector. J. H. Price
 Show case or show front. C. F. Kurz
 Sign. J. B. Schmidt
 Siphon filling machines. Salts injector for. J. H. Fox
 Slicing machine. C. R. Zorsch
 Smoking pipes. Manufacturing. W. C. Cunningham
 Soap cake. W. R. Bowen
 Soda water dispensing apparatus. O. A. Geddes
 Sound producing device suitable for sirens, &c. R. Hope-Jones
 Sounding apparatus. Navigational. Z. L. Tanner
 Sparking device. D. M. Bliss
 Sparking device. C. O. White
 Speed sheave. Variable. B. Christensen
 Spelter furnace. A. J. Ash
 Stacker. Pneumatic. J. B. Bartholomew
 Stairs, &c. System and apparatus for facili-
 tating the ascent of. L. Brennan
 Stalk cutter. W. R. Welsh
 Stamping machine. H. Watkins
 Starch. Manufacturing. J. Loiselet
 Steam generator. J. L. Giroux
 Stereotype plate and base. C. S. Patridge
 Stitch indenting machine. A. Olson
 Stone. Apparatus for the manufacture of arti-
 ficial. F. Marx
 Stone or brick and the preparation of lime
 therefor. Manufacture of artificial. O. H. Anderson
 Stovepipe ventilator. T. W. L. Murray
 Strength tester. G. Jansen et al
 Supporting device. E. M. Bowyer
 Surgical forceps. L. M. Pignolet
 Surgical instrument. L. R. Krazmueller
 Surgical instrument. Electro. R. H. Wappler
 Suspender end. W. Bloomberg
 Suspenders. E. G. Mellem
 Switch throwing device. Automatic. J. N. Quinn
 Tanning. Preparing skins for. W. L. Albee
 Tape reel. W. Keuffel
 Telegraphy. Electric. S. G. Brown
 Telephone stations. Sound strengthening ap-
 pliance for. F. Oprendeck
 Tennis racket. House. E. Boulanger
 Thread dressing machine. G. A. Fredenburgh
 Ticket. Railway. T. C. Davison
 Tire air tube. Pneumatic. A. T. Collier
 Tire. Vehicle. W. S. Huffman
 Tire. Vehicle. F. K. Christensen
 Toasting bread, &c. Gas range utensil for. I. M. Scherer
 Tongue finishing machine. G. W. Packer
 Top roll saddle. J. Bilsborough
 Toy. Mechanical. W. P. Lyle
 Toy. Mechanical. O. C. Wiesner
 Trace fastener. T. A. Bakken
 Transmitter. A. Van Wagenen
 Trestle. Foldable. H. E. Howard
 Truck. Car. H. R. Keithley
 Truck folding frame. P. J. Kremer
 Truck. Lifting. B. Closeth
 Truck. Railway car. H. R. Keithley
 Tubing, &c. Apparatus for rotating. S. W. Titus
 Tumbler press. J. Haly
 Turbine. Combined axial and radial. R. Schulz
 Turbine wheel. J. Nadrowski
 Type distributing apparatus. J. Breakey
 Type distributing machine. J. Hinklein
 Type justifying machine. F. McClintock et al
 Type machine composing mechanism. T. Lanston
 Type setting machine. F. McClintock
 Type setting machine key mechanism. F. McClintock
 Type writer escapement mechanism. W. G. Babcock
 Type writing machine. G. W. Coffman
 Type writing machine. C. H. Shepard
 Type writing machine inking device. P. F. Nilson
 Type writing machine ribbon guide. E. J. Manning
 Type writing machine. Traveling. R. S. Shaw
 Umbrella tip retainer. B. M. Shaime
 Vaccination shields. Detachable fastening for. E. S. Oliver
 Valise, hand bag, or suit case. S. D. Chapman
 Valve. W. & L. W. Gates
 Valve. Compression. J. Morrison
 Valve gear. Locomotive. H. Waxwell

Valve for reversible steam engines. A. H. Koons
 Valve mechanism. Engine. T. H. Haberkorn
 Valve. Retaining. W. G. Lamb
 Valved stopper for receptacles, &c. S. Molnar
 Vehicle. H. P. Maxim et al
 Vehicle storm curtain. R. Reeder
 Vending machine. Cigar. W. R. Duple
 Ventilator. W. McDermott
 Vise. Hand. W. H. Wilkening et al
 Voting machine. J. B. Mahana et al
 Wagon. Dumping. M. Becker
 Wagon or sled. Convertible. J. L. Potter et al
 Wagons on tracks. Device for guiding. S. N. Stewart
 Washing machine. R. S. Higgins
 Washing machine. L. B. Brooks
 Watch demagnetizer. P. Sorensen
 Watch protector. J. Cohen
 Water bag. T. L. Allegretti
 Water closet. W. Bunting, Jr
 Water recording device. Electric. W. H. Kelly et al
 Water tube boiler. O. D. Orvis
 Wave motor. R. Millar
 Weather strip. Door. F. Fishbeck
 Weed hook. Coil spring. G. T. Bappe
 Well boring machine. F. J. Woods
 Wheelbarrow. C. Hewitt
 Window. W. D. Watson
 Window frame and sash. 3 pats. A. Rasner
 Wire stretcher. A. Cross et al
 Wire stretcher. E. M. Hand
 Zinc. Extracting. J. L. Babe et al
 Zinc or electrotypes plates. Frame or base for. S. Waterman

DESIGNS.

Buckle. Belt. L. P. Prahar
 Cabinet. Dressing. J. C. Taylor
 Casket trimming. E. R. Sargent
 Cushion cover. Portrait. E. Solomon
 Die or similar article. H. D. Call
 Fabric. Woven. 2 pats. J. W. Landenberger
 Receptacle. E. Goetze
 Stove. W. V. Robinson
 Stove or range. Cooking. E. J. Frey

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Adding machine. E. Wiswall
 Advertising device. A. Washington et al
 Air cooling and agitating apparatus. E. F. Porter
 Alloy. W. Pruszkowski
 Animal dipping apparatus. W. H. Tuck
 Bale tie. G. M. Depew
 Ball. R. K. Gray
 Barrel cleaning machine. G. Schock
 Barrel closure. W. W. Sly
 Barrel machine. Double stave veneer. W. J. Ott
 Bed. Sofa. 3 pats. H. C. Jones
 Bedstead joint. C. A. Blakely
 Bell. P. C. Arnold
 Bell. Electric. A. F. Spencer
 Bell for cycles, &c. C. Ford
 Bench clamp. V. F. Simola
 Beverage cooling or heating apparatus. C. Bocker
 Bicycle. E. W. Lymburner
 Bicycle. P. Pecor
 Bicycle. J. B. Howe et al
 Bicycle pump. D. B. Smith
 Bicycle repair spoke. F. A. Wilske
 Bicycle stand. L. H. Knoche
 Bird cage. M. Pitts
 Boiler cleaner. Mechanical. P. F. Gibbons
 Boiler cover plate. C. L. Huston
 Book. Note. A. L. Holton
 Bottle capping machine. O. Heyman
 Bottle stopper and fitting. S. Myer et al
 Bottle stopper attachment. H. A. Clark
 Box. G. S. Madancy
 Box and cover. T. Abraham
 Brake apparatus. Automatic fluid pressure. M. Corrington
 Brake operating device. M. O. Wicks
 Broom handle drying and polishing apparatus. C. A. Ridlon
 Brush. A. Steiert
 Brush and mop holder. Combined scrub. J. S. Randolph
 Buckets. Means for dumping or discharging
 materials from. H. A. L. Barry
 Buckle. Tongue. N. C. Hanson
 Button. Fly. N. M. Marshall
 Cable system of transportation. Elevated. T. Alexander
 Caisson for cleaning ships' sides and bottoms. R. Kaucher
 Calendar. F. M. Nace
 Camera and focusing finder therefor. U. Nehring
 Caus, pails, &c. Machine for manufacturing
 bail eared. J. G. Hodgson
 Cane loader. H. S. Padgett
 Car. Coal and grain. S. Kellogg
 Car coupling. W. S. Jones et al
 Car coupling attachment. T. Harrison
 Car fender. W. Bonham
 Car mover. J. W. Dear
 Car. Railway. F. Kuempel
 Car wheel. Plate metal. H. F. Mann
 Cars. Roller side bearing for railway. S. W. McMunn et al
 Carnation supporter. W. W. Thomas
 Carton machine. W. G. Chapin
 Cash register. I. S. Dement
 Cash register. R. W. Hindson
 Casting. F. Baldt, Sr
 Casting machine. Strip metal. C. C. Webster
 Cattle probe. A. Nuesch
 Caustic. Producing. H. K. Moore
 Chains. Casting. F. Baldt, Sr
 Chair. H. P. Blackard
 Chair support. F. A. Millikan
 Churn. J. W. Powell
 Cigar machine. T. E. Carpenter
 Cigar piercer. E. Todd, Jr
 Cigar storage case. J. S. Conwell
 Cigar trimming and marking machine. A. W. Waldmann et al
 Circuit controller. E. W. Vogel
 Clevis. W. M. Griswold
 Clock frame. W. H. Stevens
 Clock pendulum. D. W. Thompson

Cloth cutting machine.....J. R. Baird
Clothes line.....E. Imhoof
Clothes wringer.....C. P. Seales
Coal separator.....W. J. Hamilton
Coin controlled apparatus.....A. W. Havens
Coin delivery machine.....2 pats. E. J. Brandt
Collar fastener.....N. G. Deaton
Compass and great circle course projector.
Stellar.....R. T. Lawless
Composition of matter.....T. O. Pause
Conveyer.....A. M. Acklin
Conveyer flight.....A. M. Acklin
Cooking foods for poultry, game, &c., by
steam. Apparatus for.....G. J. Hutchings
Cooler.....H. H. Buffum
Corer and cutter. Fruit.....W. T. Acree
Corset busk.....C. F. de Grasse
Counting apparatus.....R. W. Jorres
Crate. Banana.....J. A. Davidson
Cultivator.....E. H. Bonebrake
Current motor.....W. L. Walter
Curtain pole or rod.....E. C. Phillips
Cushion stuffing device.....E. E. Berry
Cutter head.....G. Johnson, Jr
Damping apparatus.....G. Staber
Dental bur.....F. F. Hawkins
Disinfecting fluids. Device for automatically
distributing.....F. A. Martin
Dough working and shaping machine.....
W. S. & C. I. Corby
Dovetailing machine.....J. & D. Sagar
Draft rigging.....W. H. Cox
Draw gear and buffing apparatus.....P. Hien
Drier for paper, cloth, &c.....C. H. Crowell
Dumping apparatus.....B. Kelly
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Dye and making same. Blue wool.....
A. Weinberg
Dyeing.....G. De Keukelaere
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Electric controller.....E. C. Fellows
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Electric motor.....J. H. Mason
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Electric time switch.....E. H. Wright
Electric time switch.....C. F. Heath
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Elevator.....M. Hanford
Elevator cars. Regulator for controlling the
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Engine starting mechanism. Gas.....
F. A. L. Sneekner
Envelope.....W. H. Haworth
Exhaust concealer.....G. A. Hunt
Feeding mechanism. Boiler.....R. H. White
Fence.....T. Rodecker
Firearm. Repeating.....W. W. Humphreys
Fire door apparatus. Thermostatic.....
J. T. McCabe
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Fishing net sinker.....A. Johnson
Fishing reel.....L. Atwood
Fleshing machine.....W. E. Lombard
Floor.....B. A. Stevens
Floor arches. Center construction for.....
G. B. Waite
Fly trap.....W. J. Purvis
Folding chair.....W. E. Nivison
Food and making same. Malted cereal.....
J. K. Lippen
Foot. Artificial.....M. Smith
Frog operating mechanism.....F. C. Anderson
Frost on vegetation. Machine for preventing
deposition of.....S. D. Smith
Fruit, &c. Press for expressing juice from.....
B. A. Geurink
Furnaces. Cover mechanism for pit.....
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Gage.....A. Rusbatch
Garbage can.....J. M. Hutton
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Garment closure.....C. B. Howd
Garment folding device.....J. M. Beiermeister
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Garment hook and fastener.....J. H. & I. Taylor
Garment supporter.....J. H. Pilkington
Garment supporter.....A. P. & E. S. Richardson
Garment supporter, 2 pats. C. S. Nonnemacher
Gas burner. Incandescent.....A. A. Pratt
Gas burner lighting attachment.....E. W. Cornell
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descent.....L. Hicks
Gas machine weight motor.....W. D. Luce
Gas main stopper.....J. Franklin
Gate.....O. B. Jacobs
Gear. Changeable speed and reversing.....
T. A. Dicks
Gear transmission.....J. Suchy
Gearing. Belt, rope, or chain.....E. H. Hodgkinson
Gearing. Variable speed friction.....E. P. Cowles
Gelatin yieldable liquids. Obtaining.....
E. R. Edson
Glass blowing machine.....O. E. Walton
Golf ball.....F. H. Richards
Golf ball.....C. Davis
Grain or seed. Apparatus for sampling.....
J. J. Brown
Grinding machine.....M. W. Neuens
Grinding machine. Ball.....E. G. Hoffmann
Guano distributor.....J. S. Byrd
Hand protector.....D. F. Morgan
Harvester. Grain binding.....W. N. Whitely
Hay rack lifter.....W. J. Frank
Heat distributing mains. Covering for.....
W. H. Pearce
Hemoglobinometer.....T. W. Tallqvist
Hoe. Weeding.....O. Barreille
Hoist.....C. Petty
Hoist. Pneumatic.....G. E. Martin
Hoisting device.....2 pats. E. F. Atherton
Horseshoe.....J. Dillon
Hose coupling.....G. H. Caugherty
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Hot air furnace.....E. L. Heald
Hot air register. Side wall, (reissue), G. Auer
Ice. Manufacturing.....S. N. Smith
Ice manufacturing apparatus.....2 pats. S. N. Smith
Identification tag.....C. Scott
Indicator.....J. S. Baughman
Insulated wire.....J. A. Heany
Insulated wire. Manufacture of.....J. A. Heany

Insulating electric conductors.....I. Kitsee
Insulating metallic surfaces or wires.....
J. A. Heany
Insulating metallic surfaces with asbestos.....
J. A. Heany
Insulation for metallic surfaces. Preparing
asbestos for use as an.....J. A. Heany
Jar.....W. C. Schutz
Jar closure.....A. B. Schofield
Journal bearing.....E. Hill
Knife.....I. Kinney
Knitting machine.....F. B. Wildman
Knitting machines. Attachment for making
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Ladder and hose nozzle controlling apparatus.
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Lamp shade holder. Incandescent electric.....
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Leather scarfing machine.....P. Stein
Letter box.....T. C. McLin
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Life saving apparatus.....E. J. Johnson
Lifting jack lever.....W. E. Bushnell
Linotype or similar composing machine.....
J. Gray
Liquid raising apparatus.....G. L. Cudner et al
Liquid tanks. Automatic device for discharg-
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Lock.....L. Labeau
Log turner.....W. L. Leland
Lubricator.....(reissue) J. J. Tunney
Magnetic separator.....J. C. Winder
Mail bag catching and delivering mechanism.....
R. J. Meyer
Mandolin attachment.....F. G. McPherson
Messaging implement.....J. B. Wantz
Match making machine.....F. Schafer
Measuring cabinet.....J. M. Kinnard
Measuring cup.....J. M. Strout
Measuring instrument. Combination R. Barr
Medicine dropper.....W. F. Ware
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E. Wedekind
Metal. Machine for cutting beveled edges on
plate or sheet.....P. Parcells
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Metal shearing machine.....C. Clark
Microscope stage. Mechanical.....C. F. Dieckmann
Milk jar or bottle.....H. C. Emrich
Molding.....2 pats. F. Baldt, Sr
Molding apparatus.....W. C. Wright
Molding machine.....J. Hoagland
Molding machine engine.....L. S. Stiles
Mortar bed.....J. M. Holloway
Motor.....P. B. Laskey
Mustard pot.....H. Grimm
Necktie box, &c.....J. Levy
Necktie fastener.....W. Lawrence
Necktie holder.....P. M. Lewis
Nozzle for sprinkling vehicles. Spray.....
L. G. Weiler
Nut lock.....J. H. Swindell
Nut lock.....D. T. Wallace
Nut. Vehicle axle.....T. H. Tash
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Ore concentrator. Dry.....R. E. & E. Waugh
Ore separator.....E. C. O'Brien
Ore separator.....C. C. Pratt
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G. Guiraud
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Package tie.....J. A. Thomas
Pail bottom. Metallic.....K. E. Lisk
Paper jogger.....P. E. Kent
Paper jogger.....W. E. Jelf
Paper or pasteboard. Impregnating.....A. B. Glass
Paper vessel handle and fastener.....W. E. Duthie
Papers. Receptacle for containing.....M. J. Wade
Paste pot or jar.....M. J. Wade
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Penholder.....F. McIntyre
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Pencil case.....C. E. Little
Pencil rubber tip attachment. Lead.....
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Photographic developer.....A. Eichengrun et al
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A. Eichengrun et al
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A. Eichengrun et al
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Picture hook hanger.....M. A. Bye
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Pipe puller.....J. A. Haire
Pipe wrench.....A. P. McBride
Plane.....A. W. Stanley et al
Planter. Corn.....2 pats. L. P. Graham
Planter. Corn.....I. A. Weaver
Plastic materials into shreds. Machine for
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Pneumatic carrier system.....W. W. Danley
Pocket knife.....I. Kinney
Pole changer.....J. M. G. Beard
Post driving apparatus.....M. C. & E. S. Foster
Potato digger.....L. Stevenson
Printer's form or chase rack.....G. R. Hughes
Printing and embossing machine. Check.....
F. H. Cottrill
Printing attachment. Paper clip.....J. I. Carr
Printing form. Composite.....J. Roxburgh et al
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O. C. Strecker
Printing press.....J. L. Firm
Propeller. Marine.....C. C. D. Carvalho
Pulley. Wooden split.....C. Wittkowsky
Pumps. Proportionate distribution valve sys-
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Puzzle.....F. L. Napier
Rail bond.....J. E. Jones
Rail. Electric third.....P. E. McLutosh
Railway detonator.....F. Lemaire
Railway indicator.....L. F. Graham
Railway signal. Electric.....F. C. Muller
Railway signal operating apparatus.....J. A. Snow
Railway switch and signal apparatus. Pneu-
matic.....F. L. Dodgson et al
Railway switch. Street.....W. J. Bell

Railway switch. Street.....G. Shoemaker
Railway. Third rail system or magneto-elec-
tric.....W. H. Wright
Railway tie.....A. F. Crotsier
Range water reservoir.....G. H. Grimm
Register.....E. C. Fox
Register.....G. F. Hutchins
Reminding device.....G. H. Hosmer et al
Road oiling machine.....T. F. White
Road scarifier and trench cutter.....B. Asplen
Roadway for motor vehicles.....A. Clark
Roof guard.....S. P. Clark
Roost. Fumigating poultry.....O. La Rue
Rotary engine.....J. W. Strabala
Ruler. Flexible.....C. Lawrence
Ruler. Protracting.....B. B. Camden
Safe door burglar proof device.....A. M. Cushing
Safety pin.....2 pats. G. Boden
Safety pin.....E. S. Ingraham
Sand box.....J. L. Chedell et al
Sash fastener.....C. A. Goodsell
Saw. Compass.....J. F. Carey
Saw guide.....T. Prentice
Saw jointer and gage.....C. McDonner
Scaffold.....J. Boardman
Scale attachment.....W. D. Evans et al
Scale. Spring balance computing.....
J. W. Culmer
Scraper. Wheeled.....J. C. Stubbs
Scraper. Wheeled.....T. D. Radcliffe
Screw machine slotting mechanism.....
W. S. Davenport
Scythes. Machine for forming ribs on.....
A. Heurtier
Seal and die. Combined.....H. S. Maidhof
Seam. Lock stitch.....E. E. Winkley et al
Seeder, fertilizer distributor, and cultivator....
Combined.....A. Cravotto
Sewing machine ruffler or gatherer.....
J. Douglass et al
Shade and curtain holder. Window.....
W. H. Griffin
Shaft prop.....W. L. Marshall
Shears.....R. Hamilton
Sheet catching and packing device.....A. J. Maskrey
Sheet feeding and cutting machine.....W. G. Chapin
Shoe cleaner.....D. J. Foley
Shoe horn.....G. Schneider
Shot. Boarding.....C. Tatham
Silo.....O. F. Wallihan
Silo.....F. J. Ernewein
Skate. Ice.....F. E. Brown
Slate cutting machine.....C. R. Huston
Sluice box.....F. M. Johnson
Smoke consumer.....J. S. Donohue
Smoke consuming attachment.....W. McNeil
Speed changing device.....J. A. White
Speed regulator for rotary shafts.....A. E. Howe
Speed regulator. Mechanical.....H. P. White
Spigot and bung remover. Combined.....
T. Livingood

(Continued in August Number.)

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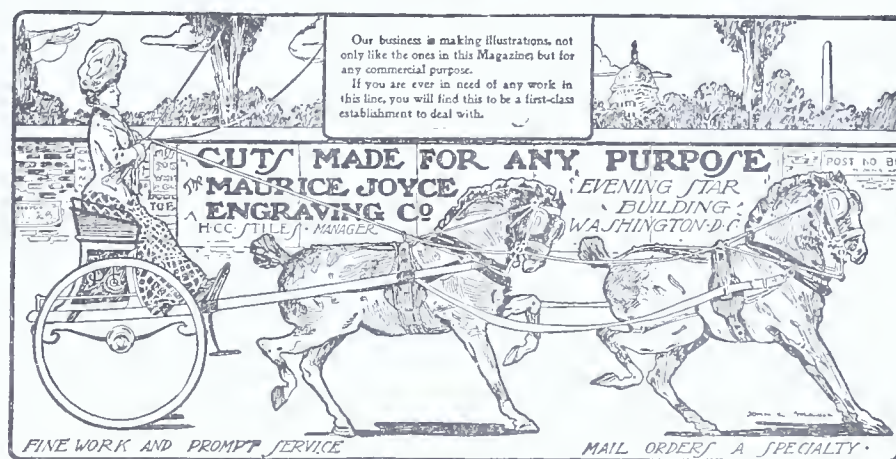
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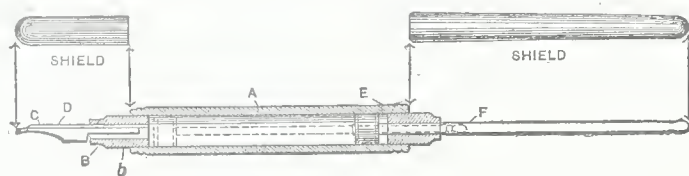
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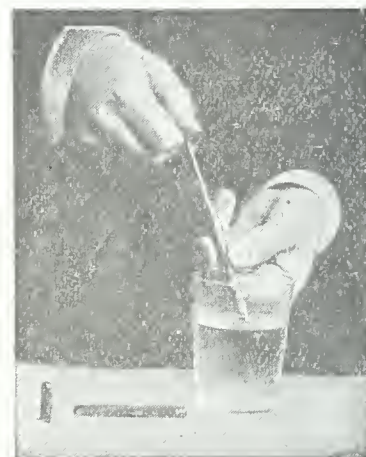
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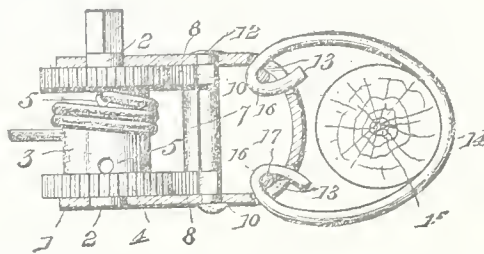
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WASHINGTON, D. C.---AUGUST, 1902.

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Electrically Driven = = = = = = Portal Cranes.

THE use of electric motors for working hoisting machinery presents many advantages, as there is no difficulty in transmitting electrical energy, and the space and weight are comparatively small, while the attendance required is simple. The accompanying illustrations taken from *Modern Machinery*, Chicago, Ill. give some idea of the construction and connections for motors of the German Portal Crane built by The Maschinenfabrik Mohr & Federhaff of Mannheim.

The German Electric Harbour crane is driven by alternating current polyphase motors, one circuit having a potential of 200 volts and a current of a frequency of 50 periods per second. The direct power of the crane is 1,500 kg., which may be increased by means of a block to 3,000 kg. The radius is 9.27 meters and the height of the jib pulley is 14 meters, while the lift of the chain hook is 20 meters.

In fixing the conductors for supplying electric current to cranes of this character, the only essential points to be attended, are that the insulation from the earth be high, and good metallic contacts are provided at the connecting points. The conductors may therefore take the most devious route, and the maintenance of the metallic contact presents no difficulty, even in the event of a mutual movement occurring of the parts that are in contact with one another: transmission of power by means of electricity is applicable therefore to all sorts of cranes and lifting machinery.

Electric motors are so easily started and stopped that even persons possessing no technical knowledge at all may soon become efficient in attending to them. The starting apparatus or current regulator may be adjusted so that the strength of the current may be increased or diminished, and the speed of the motors may be varied within certain limits and the direction of their rotation altered.

Electric motors are especially advantageous for hoisting machinery, as these are but seldom continuously at work, there being on the contrary frequent interruptions during which the motor is stopped, and furthermore the amount of power used is strictly proportionate to the work performed at the time. In the case of direct and rotary currents all continuous running transmissions may be avoided. Hoisting machinery actuated by an electric motor is ready for work at any time, a fact that essentially contributes to simplifying attendance. The electrical portal cranes are frequently preferred for working at harbors, on account of their taking up the least room on the quay and not even restricting railway traffic. The German portal cranes are

supplied with two motors, one which drives the lifting gear, and the other the turning gear, and when desired, by the use of a coupling, also the traveling gear. The electric crane illustrated in diagrams has polyphase motors, one of 23 horse power operating at 570 revolutions per minute, and the other 45 horse power whose speed is 940 revolutions per minute.

In some type of cranes of this sort reversing lifting motors are used, in which case the brake is worked, when the load is lifted, by means of an electro-magnet. The mechanical part is somewhat simpler but the distribution of electric current becomes more complicated.

This system necessitates the employment of current for lowering light loads, and the total amount of current is proportionately increased thereby and by the amount required for the magnet. In order to arrest the motor when lifting the load, or the empty hook, there is employed, after the best possible utilization

of its energy, an electrical or mechanical brake according to the kind of current used: the connections for an electrical brake or the actuating of a mechanical brake respectively is effected by means of a hand lever or automatically, the latter method being resorted to if the crane hook has reached its highest point.

Many times in cranes of this type, in order to obtain as noiseless an action as possible, the wheels are more carefully milled and the motor gear is sometimes made of raw hide. The turning and traveling gear are actuated in some cases by one motor. The power is then transmitted by a worm made from hardened steel and a milled worm wheel. Both move in a closed case filled with oil, so that in combination with the ball bearings of the worm axle, the highest possible result is obtained. The traveling gear is set in motion by pulling over a coupling as with cranes of this description, the traveling gear is mostly of a subordinate

nature, both movements, the turning and traveling therefore, never being required to be performed at the same time. In case of these movements too, the crane is stopped by an electric or mechanical brake, the arrangement being, to first utilize the energy of the crane and then the currentless motor anchor. Frequently such cranes are required to execute a limited turning movement, in which case automatic cutting out apparatus is provided, which may be adjusted to work at any desired angle of the crane. The movement of the steering lever of the hoisting gear, and the turning of the hand wheel on the turning gear starter are in conformity with the movements made by the crane, so that wrong handling is very infrequent.

The electric current is transmitted through cables, which on the one hand are connected with the crane, on the other hand with connecting boxes, and the crane under such circumstances can only travel short distances, the cable always having to be altered from one connecting box to another. If cranes of this type have to travel through very long distances, bare copper wires are employed with sliding contacts that are in a sheltered position either along a building or sunk into the earth.

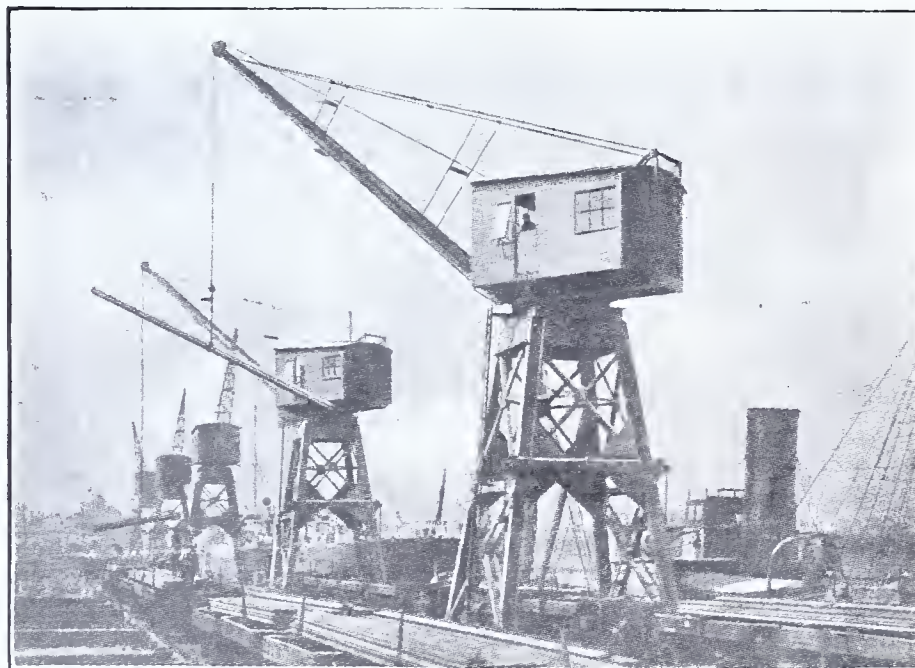


FIG. 1—FIVE OF THE SEVENTEEN ELECTRIC THREE TON JIB CRANES LOADING RAILS AT THE MIDDLEBOROUGH DOCKS (ENGLAND).

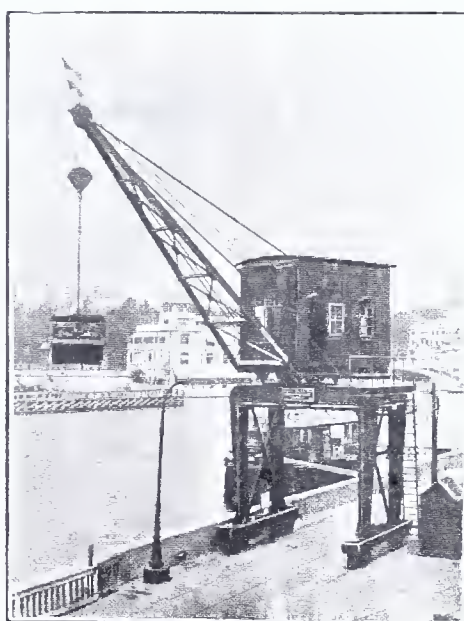


FIG. 2.—GERMAN PORTAL ELECTRIC CRANE.

U. S. PATENT OFFICE DIVISION XXV.

THRESHING, MILLS, AND STONE WORKING.

ONE OF the principal classes of inventions, the treatment of which concerns this Division of the Patent Office, is that of Threshing.

Before the invention of the threshing-machine, grain was separated from the straw by the hand-flail and by the tread of animals. These modes have now passed away except in primitive communities, and the work is done with machinery. With the hand-flail, 7 bushels of wheat, 18 bushels of oats, 15 bushels of barley, 8 bushels of rye, or 20 bushels of buckwheat, made a full day's work for one man to thrash and clean. A larger amount, of course, would be separated from the straw if the work were confined to thrashing only. A good two-horse threshing-machine and separator, driven by a tread-power, would thrash and clean 160 bushels of wheat, 300 of oats, 200 of barley, 170 of rye, and 250 of buckwheat, though some place the estimate rather higher. A ten-horse steam-engine will thrash six times as much.

William Thompson took out the first patent in the United States for a wheat thresher in 1791. Revolving flails and armed cylinders had been tried prior to this in Great Britain, and one Meikle, of Tynningham, Scotland, had devised a thresher on the beater principle, which had some practical points of value. The British machines still adhere largely to the beater system, but the American inventor resorted to revolving drums with spikes passing between others fixed on a concave breast. This is the type of the perfected American threshers of the present day, which have the conceded qualities of superior lightness, cheapness, finish of product, and rapidity of operation, with less demand for power.

The first thrashing-machines, introduced more than half a century ago, consisted simply of a spiked cylinder running in a spiked concave bed, driven with great velocity by a lever horse-power. There were no facilities for feeding the machine, or for clearing away and separating the straw, chaff, and grain: and for an eight-horse machine, at least twelve men were required while it was running, in raking the straw from the grain and in storing the straw and chaff. This work is now all done with machinery, the straw being carried away and deposited by the straw-carrier on the stack or mow without the labor of hand-pitching.

The threshers now made in this country employ two modes for separating the straw from the grain. The Pitts machine, for example, employs what may be termed the "endless aprons," and with various improvements these have been extensively used. When not driven too rapidly, they answer

an excellent purpose and make clean work. Another form is termed the "vibrator," which is furnished with a series of inclined fingers, the rapid shaking motion of which tosses up the straw and shakes out the grain, which falls through the slat-work on the screen below. The fingers merely rise and fall, and their motion sends the straw onward. The Farquhar machine has a vibrator of ribbed sheet iron with projections and open spaces, the agitation shaking the grain from the straw. In the class of thrashing, the most remarkable feature of progress in the last decade, undoubtedly is the "straw carrier," so called, that

saving and preparing the cereals for the human race.

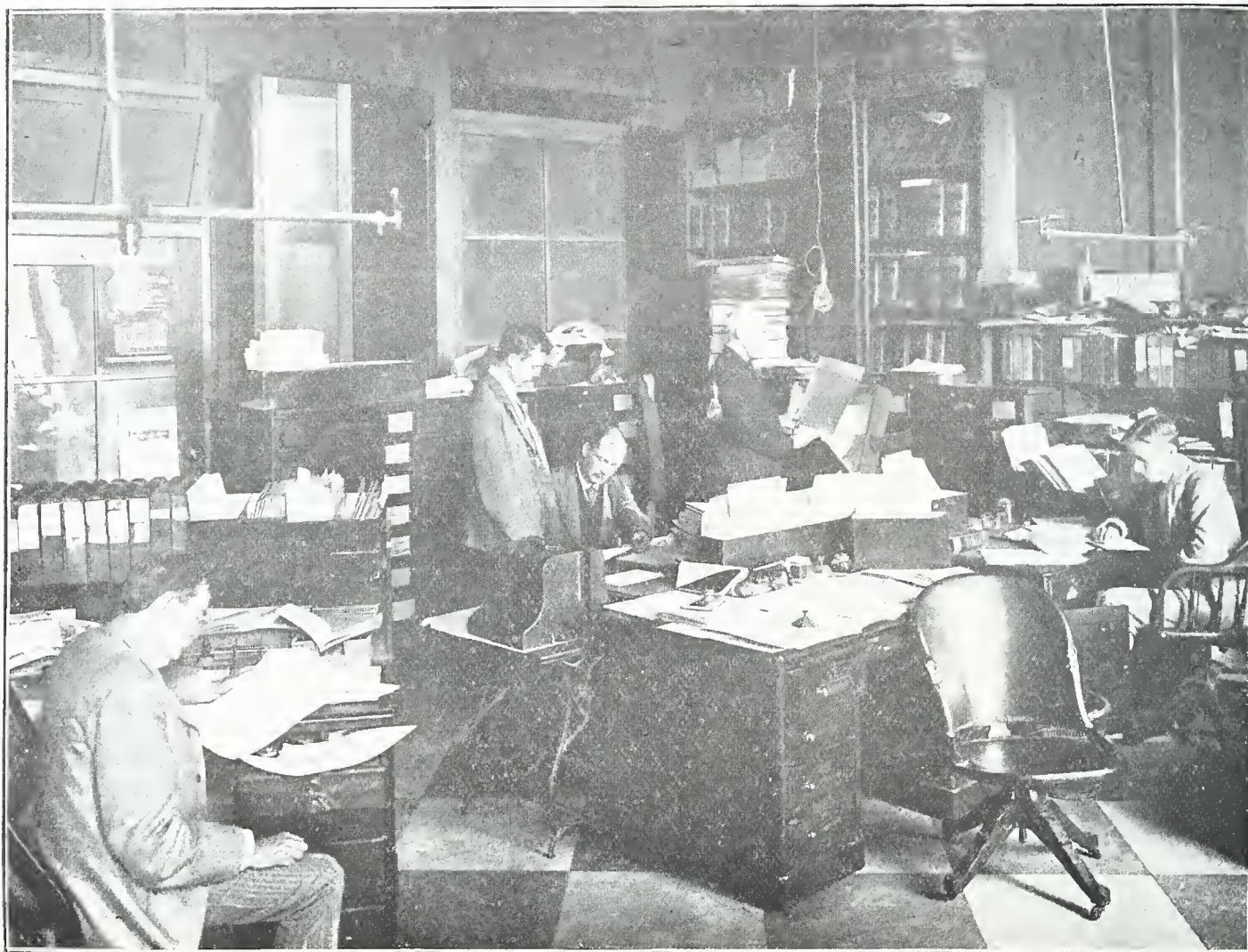
MILLS.

As considered in this Division, the subject of mills includes not only those for the treatment of grain of all sorts, but ore and coal as well. Flour mills being designed to supply all of the wants of a family, it is natural that more prominence should be given to this class of mills than all others.

The cultivation of wheat was one of the earliest developments of human civilization, and there are not wanting evidences that in making use of the grain, the primitive races submitted it to a coarse pounding or grinding, thereby reducing it to a state resembling the meal of the present day. From remains found on the sites of the ancient lake dwellings of Switzerland, it is obvious that the original form of corn-crushing or meal-making apparatus consisted of a roundish stone—generally very hard sandstone—about the size of a man's fist, with certain hol-

as that of the patriarch Abraham, it appears there was a distinction in the qualities of the flour or meal which could be produced, as Sarah was directed to "make ready quickly three measures of *fine* meal, knead it, and make cakes upon the hearth." There is much probability in the suggestion of Dr. Livingstone that the grinding apparatus used by Sarah was similar to that still used in Central Africa, and figured in the frontispiece of his *Zambesi and its Tributaries*.

The third patent granted in the United States was issued to Oliver Evans for an improvement in the art of milling (December 18, 1790). The principal features were the elevator, the conveyor, the drill, the descender, and the hopper-boy. By these, the operations from the reception of the grain to the final packing of the flour for market, were connected without the intervention of manual labor. Evans' patent, through informality, did not prove available to him during its term,



DIVISION XXV. OF THE U. S. PATENT OFFICE.

part of the thrasher which receives the grain from the cylinder and concave and effects the primary separation of the wheat from the straw.

A very large proportion of the improvement in this part of the thrasher lies in the application of the ascending air-current (blast, or suction, or both), to the carrying upward of the straw and the releasing on the way of the wheat grains, which fall to the winnower. This idea of a straw carrier is certainly as old as 1871 (A. V. Pitts); but its recent development has been immensely more extensive and practical, owing doubtless to the great development of the pneumatic straw-stacker, and it seems to be an assured fact of the future, that the use of air currents in grain separation, will have an increasing share of the work of

low or flat surfaces on two opposite sides. The rounded outline of the stone worked and fitted into a corresponding cavity in another stone in which the grain to be crushed or pounded was placed. By the deepening of the cavity in the under stone, and the addition of a wooden handle to the upper stone ball, would be formed the mortar and pestle: and in another direction, by fitting the upper stone for a motion of rotation within the cavity of the lower, the form of the quern would be produced, and the germ of the modern flour-mill elaborated. In early times, and indeed amid rude forms of society still, the preparation of meal and flour was a part of the domestic operations of preparing bread and otherwise cooking of food. At a period so remote

and was renewed by Congress, January 22, 1808, for fourteen years. This celebrated patent was attacked by infringers and by memorials to Congress for its repeal, but it was sustained by the courts. Evans was one of the most remarkable of our early inventors. He constructed the first steam dredging machine used in this country in 1803-4, which was self-propelled; and made proposals in 1804 to construct a locomotive for the Lancaster Turnpike Company. He greatly improved the steam-engine, and by some is regarded as the first to adopt the high-pressure principle. He was the first steam-engine builder in the United States, and under his patent of 1804, furnished to all parts of the country numerous high-pressure engines of superior construction for various motor purposes.

The Evans milling system prevailed in this country with but little change until about 1870, when the newly patented processes for utilizing the hard flint spring wheats of the Northwest came into use. Prior to this, superfine flour had been made by reducing the soft winter wheats at a single grinding as close as possible and by bolting out the bran. The improved process consists essentially in producing the largest possible amount of middlings at first grinding, purifying these, and then regrinding them to superfine flour. To effect this purification a large number of recent patents are directed. These ingenious inventions have made available the peculiar hard wheats of the Northwest, and facilitated their transshipment through the immense storehouses of the receiving ports.

In the art of flour-milling, the most important recent advance has been in the improvement of the so-called gyratory "plansifter," in which a flat shaker is given the circular movement usually imparted by hand to the old-fashioned household sieve. It is worthy of remark, that the earliest English flat flour-bolts were constructed to mechanically imitate this hand-movement: and that after traversing almost the entire field of mechanical movement, the most successful flour-dressers of the present day have gone back to the circular "shake" of a hundred and thirty years ago.

ORE AND COAL SEPARATORS.

In the various branches of the art of ore and coal separators, concentrators and amalgamators, invention has been quite active during recent years, and, while in the main, along old lines, there have been quite a number of inventions patented which deserve mention on account of the very marked advances involved or the status they have won.

In the class of ore washers, the most active development has been in the type of concentrating table known as the Wilfley Table, which type may be said to be the creation of recent years. Patent No. 590,675 to A. R. Wilfley, granted Sept. 28, 1897, illustrates the inception of the type. The Elmore process (Patent No. 676,679, F. E. Elmore, June 18, 1901), in which the superior cohesion between metals and oils over that between earthy compounds and oils is taken advantage of to effect a separation of metals from ores, deserves mention.

In magnetic separation, the most marked advance of recent years is the invention of Wetherill (Patent No. 555,792, March 3, 1896,) in which by tapering magnet poles the magnetic field is so intensified as to become available in the separation of many compounds so slightly magnetic that the possibility of their separation by magnetism does not appear to have occurred to Wetherill's predecessors. Much has been done in the perfection of old types of machines, and in the application of magnetism in the diamagnetic separation of gold.

Among the various sub-classes of amalgamators, the greatest development has been in those using amalgamated plates, but there does not appear to be any very radical departure from old lines.

The discovery of gold in the Klondyke stimulated the invention of devices for mining frozen earth and concentrating. These have generally involved the use of steam or the products of combustion to thaw the earth. Much has also been done in perfecting devices for dredging and concentrating sub-aqueous deposits containing gold. One such device is shown in the patent to Postlethwaite, No. 622,532, April 4, 1899.

In the separation of coal, the types to which most attention has been given are all old lines—the well known jig, upward-current washers (528,803, Ramsay, Nov. 6, 1894,) and "slate-pickers," in which pieces of slate and coal sliding down chutes acquire such different velocities that the differences of projection from the chutes permit separation, one example being shown in 579,569, Emery, March 30, 1897.

In the arts of artesian and oil well boring and stone working, (in division XXV for thirteen years, and only within the last few days transferred to a new division), there have been no radical departures in recent years, the efforts of inventors having in the main been directed to perfecting machines on old lines, except in the matter of the substitution of the electric for other forms of motors. In mining machines, the endless chain cutter type is probably the most popular and has been brought to the highest state of perfection by H. B. Dierdorff, as illustrated in his patent 684,356, October 9, 1901. An illustration of the application of the electric motor to deep well boring is seen in patent to F. Gardner, 455,037, June 30, 1891. In this case the motor and drill are suspended from a cable which is paid out as the drill cuts its way into the rock, and there are electrical connections and appliances so arranged that the operator can tell at any time just where the machine is and what it is doing. Another machine worthy of mention is covered by patent to M. C. Bullock, Nov. 3, 1891, for the reason that provision is made for counterbalancing the drill rods. In the art of dressing stone, the machines most deserving of mention on account of their range and capacity are those covered by patents to Marsh et al., 549,273, Nov. 5, 1895, a pneumatic machine, and 594,589, G. W. Badger, Nov. 30, 1897, in which the cutting is effected by rolling cutters rigidly held in place while the stone carrying platen is reciprocated to and fro beneath them.

The principal examiner in charge of Division XXV, Lewis B. Wynne, was born near Petersburg, Illinois, January 14, 1851: received an academic and collegiate education: was appointed examiner's clerk, July 30, 1872, from civil service examination: has received succeeding appointments in the same manner: was given charge of class 130, Thrashing, in 1873, and of mills in 1875: has (with the exception of a very few months in these thirty years) been so fortunate as to remain connected with the same field of work, changed only by successive additions. He has been in charge of Division XXV for fifteen years. As the examiners are primarily experts, and as there is no

good substitute for actual expert knowledge, obtainable only by continuous and long contact with particular arts, it is unfortunate, for both Office and public, that it seems impracticable



LEWIS B. WYNNE,

to avoid occasional transfers of men, experienced in one art, to another field, in which (except as to general knowledge) they are novices, and must begin from the bottom.

First assistant examiner Archibald McNaught was born in Delaware County, New York, and received such general education as could be obtained at the village academy. After leaving school he received a thorough practical and theoretical training in mechanical and steam engineering, and during these years he enjoyed and used the opportunity to read law. He was engaged in designing machinery and in superintending the building of steam engines and mill machinery until 1861, when he enlisted in a New York Regiment and served throughout the Civil War. After the war was closed, he was engaged for nearly three years in putting down wells for oil (which, however, did not prove to be oil wells) east of the Alleghany Mountains. From 1868 until his appointment in the United States Patent Office, January 8, 1881, he practiced his profession of mechanical engineer. Upon receipt of his appointment he was assigned to Division XVIII, class of Steam Engineering, where he served nearly four years, when he was transferred, against the protest of the Principal Examiner, and his own, to Division IX, class of Hydraulics. He examined applications in Pumps and Motors in this division for something over four years, when he procured a transfer to Division XXV, in which, in the classes of Stone-Working, Artesian and Oil Wells, the art of cleaning boilers and flues, and in Thrashing Machines, (of which classes he held exclusive charge for many years,) he handled, from the point of view of the Patent Office, the important arts with which practical experience had made him familiar before entering the office. Parenthetically, it would be advantageous if the work of examining could in every instance be aided by such previous practical experience.

Thomas F. Mitchell, second assistant examiner, born at Worcester,

Massachusetts, Nov. 24, 1867, graduated from Worcester Polytechnic Institute in class of 1886, and thereafter, until appointment to examining corps of Patent Office, Dec. 14, 1893, served as head chemist and superintendent of steel-producing departments with various iron and steel companies in Indiana, Virginia, Pennsylvania, and Massachusetts.

Henry E. Baker, was born in Columbus, Mississippi, September 18, 1859, and attended the Columbus Union Academy at his home until 1875, when he entered the United States Naval Academy as Cadet-Midshipman, at Annapolis, Maryland, where he remained nearly two years: entered the United States Patent Office as Copyist in 1877, and took the two years' course in the Benton School of Technology in Washington, 1877-1879. He took full course in the Law Department of Howard University, Washington, where he graduated in 1883: was appointed to the examining corps of the Patent Office as fourth assistant in 1883, and promoted to second assistant in 1887. He has charge of the class of Thrashing, and of Straw, Fodder and other feed-cutting machines.

Frederick Transom, fourth assistant examiner, was born in Brooklyn, N. Y., May 18, 1869, but is, in all other respects, a Pennsylvanian, having lived most of his life at Philadelphia, Pa., where, after passing through the public schools, he served a four years apprenticeship with the machine tool firm of Bement, Miles & Co. This practical apprenticeship was supplemented by a thorough course in theoretical engineering studies at the University of Pennsylvania, from which he graduated as a mechanical engineer in 1895. After graduation, Mr. Transom entered the service of the Standard Oil Company as a draftsman, but was soon put in charge of a central electric light and power station belonging to the Company, whose service he left to accept the position of fourth assistant examiner in the Patent Office, the date of his appointment being July 29, 1901. Has charge of Flour and Ore Mills, including for example Crushers, Roller Mills Pulverizers, Ball Mills, etc.

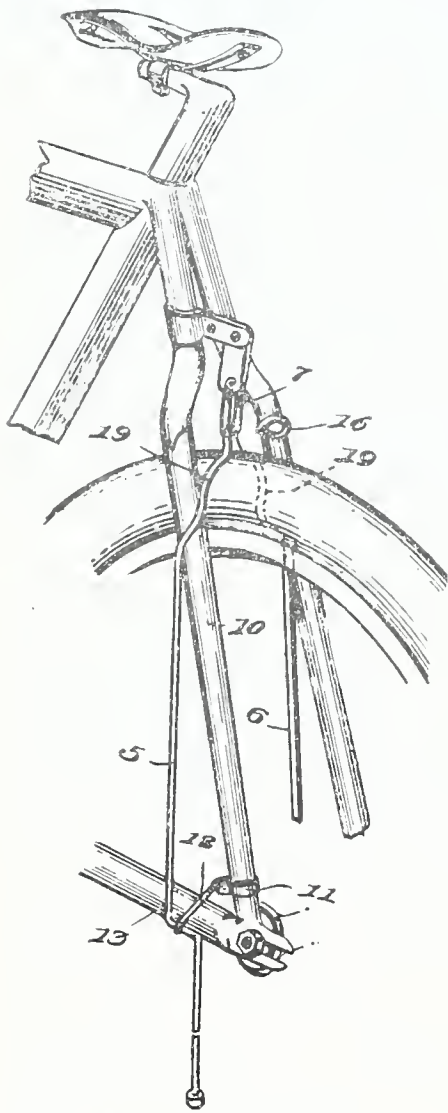
Carlos P. Griffin, fourth assistant examiner, started life in Indiana, but has had a quite a varied experience in the acquirement of that fund of general information and technical knowledge so necessary to the proper discharge of the duties of a Patent Office Examiner. Mr. Griffin is twenty-nine years old, and was educated in the public schools of Sacramento, California, and at the University of California, from which he graduated, after a four years' course, as a mining engineer. Since leaving college, he has held various positions in the practice of his profession, being for a time in a assay office at San Francisco: then spending some months on a prospecting trip through the gold fields of California, after which he put in three or more years running reduction mills in California and in Mexico. He was appointed to his present position as fourth assistant examiner on February 6, 1902. He has charge of the classes of Vegetable Cutters and Crushers, Butchering, and several important sub-classes of mills.

CLEVER NEW PATENTS.

Bicycle Support.—Telephone Selecting Device.—Pneumatic Straw-Stacker.—Turntable for Motor Fans.

Bicycle Support.

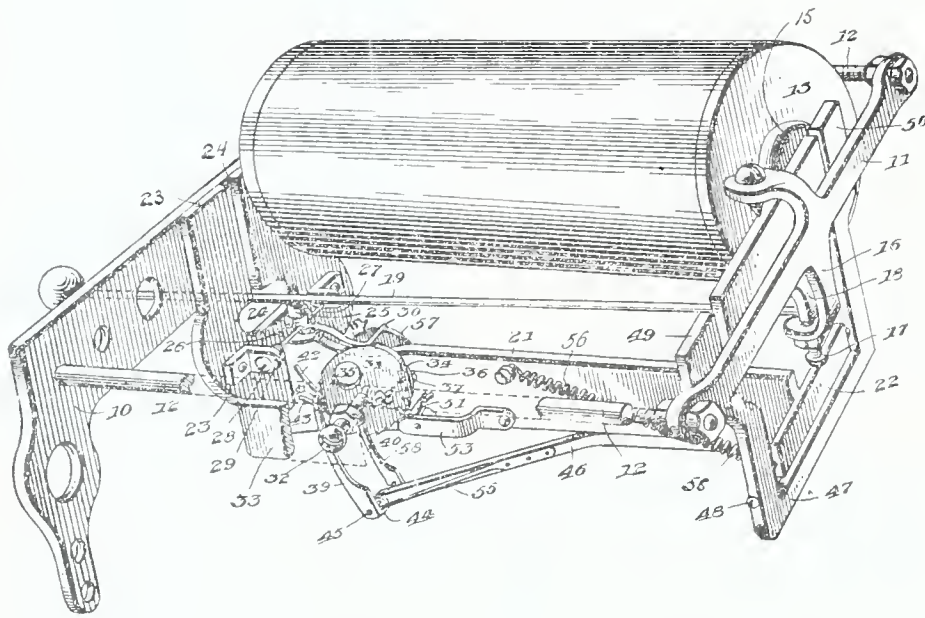
An invention that will prove of interest to wheelmen is a bicycle support recently patented by Mr. Melvin H. Tyler, of Muncie, Indiana, who has devised a simple article, which can be attached to a bicycle, and be moved into and out of operative position without the necessity of the rider dismounting. The device consists of a pair of legs 5, and 6, formed of a single piece of wire as shown in the accompanying illustration, the upper ends of these legs being connected to a link that is pivotally attached to a bracket, the bracket being fastened to the rear fork of the frame. Links are also connected to the lower portions of the legs, and are for the purpose of strengthening or stiffening the same. When not in use, the legs are raised by simply throwing the upper link to



an upright position, and thus their lower ends will be raised from the ground. To move this support to operative position, it is only necessary to swing the link downwardly to the position shown in the illustration, whereupon the lower ends of the legs will be brought into engagement with the surface upon which the bicycle rests, and thus constitute a support for the same. It will be apparent that the support may be cheaply manufactured as it is made of sheet metal and wire, the several parts being so formed that they can be readily stamped to proper shape. Further than this any one can apply it to a bicycle and when in place it is not in the way, nor does it add materially to the weight of the machine. Taken altogether, it appears to be an entirely feasible and practical scheme which may be put into actual use.

Telephone Selecting Device.

In telephone systems, where several subscribers are on a single line, in calling up one, the bells of all others are necessarily sounded, and different numbers have been employed to distinguish between them. Mr. William D. Watkins, of San Jose, California, has, however, devised a very ingenious means which is so arranged that any subscriber on a single line may be rung up without sounding the bell on



any other communicating instrument. The device employed is capable of use in connection with the ordinary telephone signal bell, and broadly stated, it consists of a locking device in the form of a disk which normally holds the elapper against movement, and is released through the medium of the bell magnets and connected mechanism, and in response to a predeter-

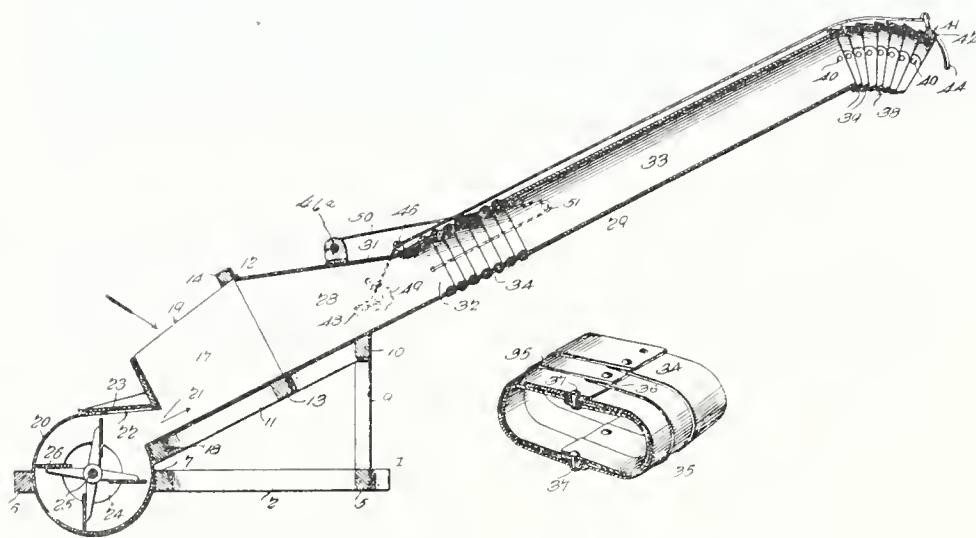
mined number of intermittent currents. Thus, if number one is to be called, a single turn of the generator crank will unlock the bell of the instrument desired, while the others requiring two or three calls will not be released. It will be noted, however, that with this arrangement as it stands, should a larger number be called, all the instruments having the smaller numbers would be consecutively unlocked and rung, but Mr. Watkins has provided for this by a very ingenious combina-

tion of disks, so arranged that they will only be brought in coacting relation to unlock the bell of each instrument when the particular number of that instrument is rung, the bells of the others being still locked and therefore silent. The advantages of this scheme will be apparent to those who have had experience in this business, and Mr. Watkins' invention, it is thought, should find favor.

Pneumatic Straw-Stacker.

Messrs. Samuel D. Felsing & Elias G. Gustafson, both of Crookston, Minnesota, have for a long time been associated in the threshing machine business, and have invented many important improvements on these machines. One of their latest is a straw stacker for which they have recently been granted a patent. The stacker is of the pneumatic type, and is en-

the straw is deposited from the threshing machine. From the upper portion of the hopper extends the pneumatic stacker tube, comprising an intake or throat 28, and a straight inflexible section 33, the tube being connected to the throat by a flexible portion 34. The outer end of the tube has a flexible discharge section to the end of which is pivotally attached a deflector. A suitable



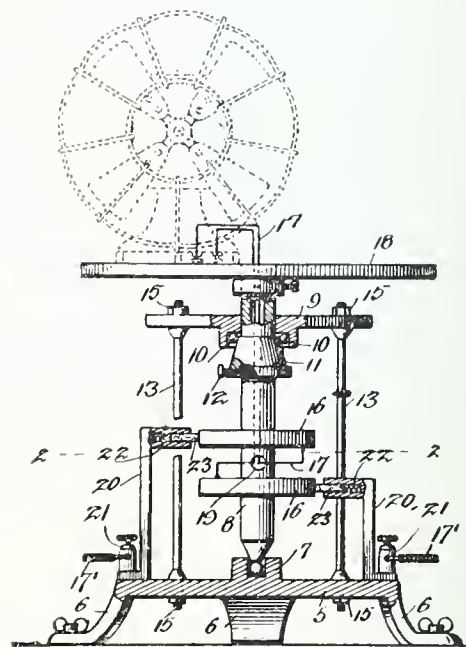
tirely separate from and independent of the threshing machine. It is mounted upon a wheeled frame that can be connected to any ordinary thrasher and used in connection therewith. The illustration herewith presented is a sectional view through the attachment, the wheels being removed. A hopper 17, is employed into which

cord is employed for moving this deflector, and also the discharge section, and another cable shown at 50, is provided for moving the tube laterally. A rotary fan is located below the hopper 17, and is in communication therewith so that a direct blast of air is thrown across the hopper into the tube. This constitutes efficient means

for elevating the straw, and one of the best features is that it can be used in connection with any machine. There is apparently no doubt but that the pneumatic or wind stacker will in time entirely supersede the old fashioned endless belt stacker, and the present invention appears to be a long step in that direction, as the endless belt conveyers may be removed from the old machines and this stacker can be used in place thereof.

Turntable For Motor Fans.

While electric fans are a boon to sweltering humanity, the great trouble with those of smaller size, generally known as "buzz fans," resides in the fact that their range is limited, as they direct a small volume of air through a room without materially affecting the surrounding atmosphere. Mr. Noah M. Powell, of Quincy, Illinois, has given the matter considerable thought, and as a result, has devised means of a novel form for effecting an even distribution of air to all parts of the room. He has assigned a one-half interest in his patent to William A. Shumate, also of Quincy, Illinois. The invention comprises a revolving table secured to an upright standard, which is journaled in a suitable frame. The standard is hollow, and in it are placed the conducting wires connected to suitable disks which are fastened to the standard. Brushes located upon the frame engage the disks, and are connected with any suitable source of



electrical energy. The fan is placed upon the table at one side of its center, and when revolving, acts substantially as a propeller, so that when running, the table is revolved, and the current of air is therefore thrown in all directions. The frame can be secured if desired in any suitable place, and by arranging the fan nearer or further from the center of the top, the speed of rotation may be varied as desired. By this arrangement the current of air can be turned automatically on and off a person, and the disagreeable and often dangerous results of a continuous blast are thus avoided.

AUTOMOBILISM IN PRUSSIA.

THE Annual Pan-German Motor-Carriage Exposition was opened at Berlin on the 15th and closed on the 26th of May. As its title implies, this was not in any sense an international competition, like that of three years ago; but simply a friendly display by the Union of German Motor-Carriage Manufacturers, under the joint auspices of the German Automobile Club and the Middle European Motor-Wagon Association, which collectively includes most persons and firms in Germany who are interested in one way or another in the subject of automobiles.

Concisely stated, it has been a mechanical display, in which each manufacturer exhibited to his colleagues, patrons, and competitors the best that he has thus far accomplished, including, naturally, such improvements as have been made since the international exposition which was held there in September, 1899.

The list of exhibitors included 105 firms, all German except two, one of which is a maker of springs and axles at Paris, and the other a manufacturer of small fixtures at Budapest.

the general type of the Mors and Panhard racing machines which are so well known in America—that is, with gasoline motors placed high in front, and transmitting the driving power either through chains, or a longitudinal shaft and beveled gearing to the rear axle and wheels. Two makers—the Benz Motor Company, of Mannheim, and the Dietrich Company, of Niederbronn, in Alsace—still utilize their plan of power transmission from motor to driving wheels by means of a belt and pulleys. The one real novelty in this line is the device of Professor Klingenberg, exhibited by the Motor Fabrik Pasig-Munich, in which the motor, inclosed in a dust-proof sheath, rests upon and is geared directly to the rear axle of the carriage. The axle is in two sections, connected at the center by a complicated device, the details of which are shown in the cut below, and which provide for differential motion as between the two hinder wheels and couplings for different rates of speed. The idea seems to have been adapted from a tricycle of French origin, and its application to a motor carriage is ingenious and interesting. The motor works directly on the driving shaft with the maximum economy of power; the working parts are not only securely inclosed and protected from mud and dust, but work in a bath of oil, which secures perfect lubrication. On the

quality. The puffing, noise, and vibration formerly so disagreeably incident to all hydrocarbon motors, although not yet overcome, has been greatly reduced by the inventions of the past three years. The same improvement is noticeable in pneumatic tires, in the greater lightness and beauty of wheel construction, in which slender metallic hub with ball bearings, light but strong wooden spokes, and improved methods of fastening and removing tire mantles, have been utilized.

The whole subject of electrical igniters for gas and spirit motors has made great progress in Germany during recent years, and the exhibition included several kinds which furnish an effective and reliable spark with a minimum consumption of current. Some of these are fed from storage batteries; in other cases the current is generated by a Rumkorff coil or a small dynamo carried in the automobile and driven from the axle. Among many improved fixtures were a set of reservoirs in which benzine can be kept with the greatest measure of safety, the tank of a motor carriage filled by a device which registers automatically the amount of fluid taken and indicates by a dial at any moment the quantity remaining in the tank. This system is a check upon the tendency of some chauffeurs to overcharge their employers for gasoline consumed.

Three years ago, it was thought that the electric carriage—or perhaps a combination of gasoline and electric motors that could be made self-sustaining and independent—would be the machine of the future. Now, the electric vehicle has been practically abandoned because it requires an expert electrician to manage it, and is, moreover, generally heavy, costly, and limited in working radius to the neighborhood of towns with electric lighting or power plants. It is therefore set aside to await the further development of the storage battery; and, as steam carriages are not yet permitted to be used on public streets in Prussia, the hydrocarbon motors now have the field to themselves. The gasoline vehicle, although greatly improved, is still more or less noisy, malodorous, and subject to vibrations that constrain the intending purchaser to wait still longer before choosing a machine.

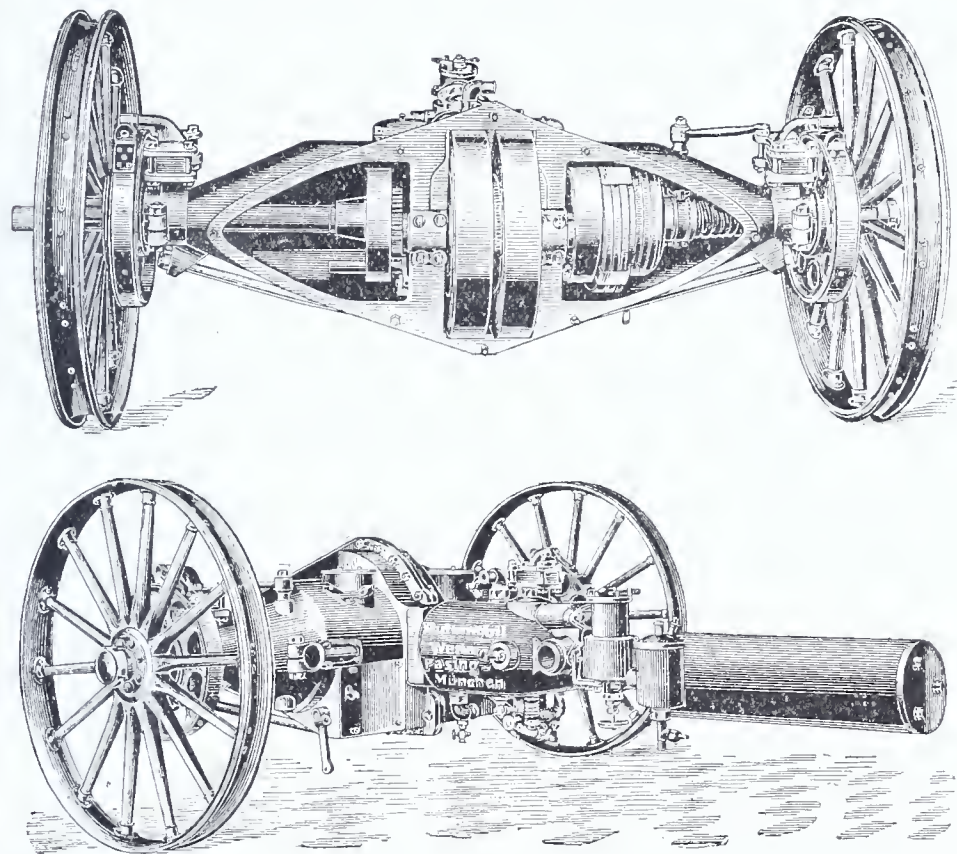
An Automobile Trip to the North Pole.

Andree tried to reach the North Pole in a balloon; Nansen tried to walk there; and now Captain Bernier, a Canadian explorer, propose to reach the pole in an automobile.

The automobiles, in which he proposes to make the last stages of his trip to the north pole, are adapted from a Russian invention. Instead of wheels they have rollers. Such invention has been used with success on extensive ice-packs similar to those of the polar regions. The Captain's plan is to place his vessel in the ice-pack off the coast of Siberia, at a point which he calculates will drift him into the nearest point attainable to the pole. When that point is reached, he will disembark working parties, who will carry wireless telegraph outfits, and the automobile sleigh will then be put into commission. Captain Bernier's plan of drifting with the currents that carry the pack-ice to the Coast of Greenland is based on actual observation by men experienced in the polar seas.

Electrical Process for Preserving Wood.

A process adapted not only to preserve railway ties, telegraph lines, etc., but also to use for small pieces of wood employed in cabinet-making, etc., has recently been put to work in Germany. The apparatus consists of a tank of convenient shape to receive the wood to be treated, on the bottom of which is laid a lead plate connected with the positive pole of a dynamo. The wood to be treated rests upon this plate, and is covered by another plate connected with the negative pole. The tank is filled with a solution of resin in borax, and carbonate of soda. The action of the current causes the sap to exude from the wood and flow up to the surface where it can be skimmed off, the antiseptic solution taking its place. After a treatment of from five to eight hours' duration, the wood is withdrawn from the bath and dried either in the open air or in kilns. The current used is at a pressure of 110 volts, and energy is consumed at the rate of about one kilowatt to thirty-five cubic feet, or 420 feet board measure of wood. It is somewhat less than this when the wood is freshly cut and still full of sap.—*Electrical Review*.



It required but a glance through the rooms to show that the leading German builders have made great progress in automobile construction since 1899. Not only are the carriages in general lighter, more shapely and elegant in outward finish, but they conform more closely in model and relation of parts to modern standards of construction, typified by the leading French machines. Steam carriages formed no part of the display. Electric automobiles were there, but so few in number and so unchanged from the types of three years ago as to form only a passive feature of the exposition, in which the gasoline and alcohol motors were supreme.

Of the sixty or more vehicles on exhibition, at least five-sixths were of

other hand, it has the ominous disadvantage that the motor, with all the complicated and delicate mechanism of transmission and differential movement, rests on the axle without springs, and would therefore, in the opinion of critics, be soon shaken out of service by the vibration of travel over a rough road.

The dominant note of this exposition has been the evidence everywhere made manifest of a general and notable improvement in many details, not only in the construction of motor carriages, but in the many fixtures connected with their use for pleasure, sporting, or business purposes. Three years ago few of the carriages exhibited were provided with ball bearings; now they are universal and of unsurpassed

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Siggers, Patent Lawyer, Washington, D. C.

John B. Walker, Inventor; E. Fred Nordman and O. E. Randle, assignees, Bessemer, Ala. Hand Oilier.—In the present invention compressed air is employed for forcing the oil from the can through the spout. The air pump constitutes the handle of the can and has a valved communication with the upper end of the same. The plunger is slidably mounted in the handle, and a suitable hook is employed for normally holding the plunger within the same. The oil exit from the body of the can passes through a valved casing which communicates with the spout, and a valve is slidably mounted in the casing, being normally held in closed position by a suitable spring. A finger piece is connected to the valve and projects from the casing contiguous to the handle. In use, the operator first pumps air into the can, and when he desires to discharge a quantity of oil, it is only necessary to press the finger piece, thereby opening the outlet.

Benoni R. Harrington, Oklahoma City, Ok. Ter. Magazine Gun.—This new gun has several very important features which have been broadly covered by a patent. The most important feature of the gun is a rotatable cartridge carrier, which is controlled by a slide mounted upon the barrel and the magazine, whereby the cartridge carrier may be rotated to eject an exploded shell, and to project a new cartridge into firing position, the controlling means at the same time cocking the hammer, and locking the rotatable carrier against accidental movement, when in its firing position. In constructing the gun, small and complicated parts have been dispensed with, and therefore the gun presents a very effective and durable fire arm, which is not liable to get out of order and may be conveniently cleaned whenever necessary.

Hugh Glacken, Conroe, Texas. Egg Preserving Apparatus.—The problem of preserving eggs when packed or stored for a considerable time has been effectively solved by Mr. Glacken, who has invented a crate or container made up of a plurality of superposed sections, which are hinged or pivotally connected, so as to give access to the successive sections. Each section is provided with transverse and longitudinal wires, to divide the section into cells for containing individual eggs, and each section is provided with an endwise movable strip of oil cloth, which has its smooth surface underneath, and its upper surface coated with adhesive material and sand to frictionally support the eggs, the strips being projected at opposite ends of the sections, and connected by means of handle bars, for simultaneous movement to turn the eggs, whereby the position of the latter may be frequently changed, so as to prevent settling of the yolks thereof, and by this means to effectively preserve the eggs.

Earl M. Bunce, Inventor; American Fence Post Co., assignee, Elyria, Ohio. Fence Post.—This post consists of an open-ended metallic tube which is provided throughout its length with transverse perforations, of which those above the ground are intended to receive the runner wires. The foot of the post is inserted into a hole in the ground and cement is tamped about the foot of the post. The interior of the post is then filled throughout its entire length with cement, which has been poured in through the top thereof, portions of the cement filling, being forced outwardly through the perforations in the foot of the post, and united with the cement about the exterior of

the post, so as to form strong and durable connections between the post and the cement base.

Phoenix M. Gutleber, Liberty Corner, N. J. Draft Appliance for Vehicles.—This device consists of a pulley fixed to the rear end portion of a running gear, another pulley having a spring connection with the tongue or pole, a slidable draw-bar mounted upon the pole, and a cable having one end secured to the slidable draw-bar and its opposite end secured to the rear fixed pulley, intermediate portions of the cable being reeved through the two pulleys, whereby strain and sudden jerks are removed from the shoulders of the draft animals.

Mr. Gutleber also has another patent on a trace, wherein a rope is employed with one end fixed to the hame or collar and its opposite end fixed to a whiffletree or draw-bar, intermediate portions of the rope being reeved through front and rear pulleys of which the rear pulley is fixed to the draw-bar and the front pulley, is yieldably connected to the hame or collar by means of a pair of diverged helical strings, whereby draft strains are considerably relieved from the shoulders of the draft animal, and therefore sore necks and shoulders are prevented.

John P. Mern, Brooklyn, N. Y. Hydrant Cap or Head.—The invention discloses novel means for facilitating the inspection and repair of fire hydrants. These hydrants are part of the fire-fighting apparatus of all large cities, and it is therefore necessary to keep them in working order. To facilitate the inspection, Mr. Mern provides a cap or head capable of being attached to ordinary forms of hydrants now in use. The head is provided with a peep hole, through which the inspector may observe the interior of the hydrant, illuminated by means of an incandescent electric lamp passed into the hydrant casing through the usual nozzle and suspended by its wire. In addition to this simple and effective provision for ascertaining the cause of the trouble, the patent discloses a simple portable apparatus for thawing and clearing the hydrant in the event of its freezing. This apparatus includes a pipe extended into the hydrant through the opening in the cap, an injector at the upper end of the pipe, and a steam pipe communicating with a portable generator and arranged to supply steam either to the interior of the hydrant to thaw the same, or to the injector for the purpose of creating sufficient suction to clear the hydrant of water.

Felix S. Towle, Hackensack, N. J. Copy Holder.—The copy holder is designed to hold a stenographer's note book, and is used either as a lap support for the same while taking notes, or as an upright support which holds the book at an inclination while the operator is transcribing the work. The holder comprises a metal frame, preferably having the form of a plate with a transverse opening through which the leaves of the book are passed as the pages are transcribed. The book is held in place by a pair of oppositely-disposed clips struck from the plate, and is supported at its lower edge in a pocket. This pocket is formed in a foot flange which provides a substantial base for the holder when in an upright position. To the back of the plate or frame is pivoted a wire supporting leg, designed to support the holder in an inclined position, and capable of being swung flat against the back of the plate when the device is not in use, or when it is used as a lap support for the book.

Heman W. Stone, Jr., Morris, Minn. Belt Tightening Tool.—This tool for which broad patent protection has been secured, is designed with special reference to the tightening of elevator belts, but is equally applicable to any form of belt or binder. The device comprises two plates, one of which is

formed with a series of openings designed for the reception of a projection or beak at the end of the other plate. These plates are secured in any suitable manner to the opposite ends of a belt, and a lever is utilized to disconnect the plates, advance them endwise to tighten the belt and effect their reengagement at an advanced point. The lever is in the form of a single metal bar having a reduced end passed through a slot in one plate and engaging one of the series of openings in the other plate. The device is most ingenious, and is unequalled for simplicity of construction and effectiveness for the purpose of tightening belts.

Franklin R. Derrick, Brodhead, Wisconsin. Book Cover.—As is well known, publishers in placing books upon the market, ordinarily protect the permanent covers by means of a temporary paper cover, which is formed of a sheet of paper that can be readily removed so that a purchaser may examine the binding. These are generally left upon the book by the purchaser, but a great objection to them is that they are continually slipping out of place, much to the annoyance of the reader. The present invention is designed to overcome this, and it consists in applying triangular tabs which are pasted to the temporary covers and extend over the top and bottom edges of the permanent covers, thus securely fastening the said temporary covers in place.

George E. Ernst, Normal, Ill. Twine Holder.—In this device, a base plate is employed carrying a projecting spindle, and an arm that is arranged parallel with the spindle. The ball of twine is journaled upon the spindle, and a cap is placed over the end of the same, being held by a thumb nut threaded upon the projecting end of said spindle. This cap plate not only serves to hold the twine against displacement, but constitutes a frictional bearing that will prevent the ball unwrapping too easily, and thus obviate any slack. The holder can be manufactured at very small cost, and is altogether an ingenious invention.

Morris L. and Willard D. Warner, Hudson, Mich. Gas Separators.—The device disclosed in this patent is a separator capable of attachment to illuminating and heating systems, for the purpose of freeing the pipes of any accumulation of oil due to the condensation or the imperfect vaporization of the gas supplied to the system for consumption by the illuminating or heating devices thereof. The attachment is in the form of a hollow drain plug, designed to be screwed into the lower end of a gas main. Within the plug is extended from its upper end an inlet pipe, through which the oil drains into the plug. The discharge of oil is effected through a discharge pipe extending into the bottom of the plug and terminating in a plane above the lower end of the inlet pipe. This arrangement of the pipes within the plug insures the formation of a liquid seal, which, while permitting the oil to drain off, prevents the escape of gas from the system.

Herman M. Lillo & Ole A. Giere, Rockdell, Minn. Sack Holder.—This device is particularly adapted for platform scales, and consists of a hopper having sack-holding hooks, and a pair of vertically aligned substantially horizontal arms at opposite sides of the hopper to connect the same to the uprights of the scale. The upper member of each pair of arms is elastic, and has its opposite ends pivotally connected to the adjacent standard and the hopper, respectively, and twisted into a spring coil near its rear end. Each lower arm is rigid and pivotally connected to the hopper and the adjacent standard, and provided with an offset near its rear end, so as to lie parallel beneath the upper arm. There is a stop projection upon the standard to limit the downward pivotal

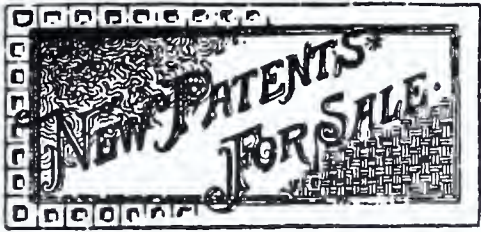
swing of the spring arm. By this arrangement, the hopper is yieldable vertically and at the same time is maintained substantially horizontal.

John S. Padon, Inventor; Joseph L. Van Wormer, Assignee, West Plains, Mo. Sewing Awl.—This device comprises a handle having one end reduced to form a cylindrical stem, from which projects a plurality of externally screw-threaded needle-clamping jaws, with an adjusting nut thereon to clamp the jaws upon a needle. A thread spool is rotatably mounted upon the cylindrical stem, and a washer plate is held between the outer end of the stem and the nut. There is also a thread guide consisting of a plate secured to the handle, with its outer end fitted in a notch or seat in one edge of the washer plate, there being an intermediate opening in the guide, to receive the thread at it comes from the spool and enters the eye of the needle. The device is being manufactured and is meeting with a ready sale.

Edwin T. Stuart, Inventor; Ottawa, Kan.; James Q. Blodgett, Assignee, Moran, Kan. Nest Egg.—This device consists of a hollow elastic perforate egg-shaped body to contain a powdered insecticide, whereby the latter will be effectively supplied to the nest and the body of the fowl when the device is compressed by movements of the fowl. One end of the device has a filling opening, which is normally closed by means of a hollow plug having an open outer end. Within this plug is some suitable absorbent material to hold a liquid insecticide. This liquid insecticide is designed to give off fumes which are noxious to vermin, without disturbing or injuring the fowl in any manner whatsoever. Thus, there is a combined action of powdered and liquid insecticide to keep the frame free from reunion.

William W. Locher, New Castle, Pa., Knockdown Bed.—This bed has upper and lower bed bottoms or sleeping sections and duplicate head and foot sections, which are foldable when the bed bottoms are disconnected therefrom. Each section consists of opposite end posts and a intermediate post formed in longitudinal sections, with upper and lower cross bars connecting the posts and formed in sections, which are hinged together and also form a hinged connection for the members of the intermediate sectional post, whereby each head and foot section may be folded when not in use. Each bed bottom consists of two longitudinal side rails and an intermediate side rail, the ends of the rails being reduced and passed through openings in the posts, with keys inserted through the ends of the rails to prevent displacement from the posts. The meeting faces of the sectional intermediate posts are provided with corresponding recesses which register to form openings for the reception of the ends of the intermediate rails. A bed bottom of canvas or the like is stretched across the tops of the rails and held thereon by means of strips which are nailed to the rails.

Millard F. Sinclair, Humboldt, Tenn., Inventor, Mack F. Harbour, Okolona, Miss., Assignee. Load Indicator for Freight Cars.—This device consists of a dial hung from the bottom of the car and having a rotatable pointer which is carried by a shaft having a pinion. A rock-shaft is journaled upon the bottom of the car and has one end provided with a crank-arm, at the outer end of which is an arcuate rack in mesh with the pinion. The opposite end of the shaft has a crank-arm from which depends a pivotal connecting rod having its lower end pivotally secured to a bracket carried by some part of the adjacent truck, preferably the spring plank, whereby a depression of the car body rotates the pointer so as to indicate the weight of the load.



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FOR SALE.—Patent No. 699,461, dated May 6, 1902. Clutch Device. Can be applied to practically all makes of motors, especially the alternating class. Address Emil Dysterud, Monterey, N. L. Mexico. (sep)

FOR SALE.—Patent No. 701,657, dated June 3, 1902. Mop Holder. A simple attachment whereby a scrubbing brush may be applied to a mop holder without altering the construction of the latter. Every household needs one. The patentee would like to make suitable arrangements with manufacturer. Address Mrs. Augusta L. Wilson, 1033 Berkeley Avenue, Pueblo, Colorado. (sep)

FOR SALE.—Patent 513,249, dated January 23, 1894. Combined car and pipe coupling. The best, simplest and most durable ever invented. Address Wm. N. Sewell, Winchester, Ky. (sep)

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FOR SALE.—Patent No. 698,753, dated April 29, 1902. Propelling gear for motor vehicles. Would like to hear from manufacturers of automobiles. Address Dr. George W. Smith, Hardin, Ray County, Missouri. (ag)

FOR SALE.—Patent No. 697,954, dated April 15, 1902. Underground tank or receptacle for the storage of water or for other purposes. Patentee will work Texas himself. Will sell rest of United States, in whole or part. Address Robert P. Stewart, 407 Bonham Street, Paris, Texas. (ag)

FOR SALE.—Patent No. 692,128, dated January 28, 1902. Detachable shoe heel. For particulars address Vincent A. Fabricki, Box 161, LaSalle, Illinois. (ag)

FOR SALE OR LEASE ON ROYALTY.—U. S. Patent No. 692,083, dated January 28, 1902. Also Canadian patent 75,213, dated March 18, 1902. Traveller's lock. Can be manufactured at small expense and sold readily. Address Henry Spear, 119 East Canal St., Richmond, Va. (ag)

FOR SALE.—Patent No. 695,501, dated March 18, 1902. Butter cutting machine. Will sell entire right or lease on royalty. Best machine out for cutting tub butter. Address G. L. Smith, P. O. Box 151, Goodground, Long Island, New York. (ag)

FOR SALE.—Patent No. 691,289, dated January 14, 1902. Thread and Cord Cutter. Constructed from a single piece of sheet metal. This patent is worth investigating. Address Mrs. C. P. McKim, Box 116, Newton, N. J. (ag)

FOR SALE.—Patent No. 689,442, dated December 24, 1901. Cotton Chopper Attachment for Cultivators. Can be applied to any cultivator now in use. Easily attached. No extra expense in operation. Address John J. Vickers, Pittsburg, Texas. (ag)

FOR SALE OR LEASE ON ROYALTY.—Patent No. 693,849, dated February 25, 1902. Also Canadian patent No. 75,474, dated April 15, 1902, for twine holder. Prefer to sell Canadian patent outright. Address G. E. Ernst, Box 546, Normal, Illinois. (ag)

FOR SALE.—Patent No. 695,885, dated March 18, 1902. Lock-stitch sewing awl. A unique and useful tool. Will fill a great want on the farm and in any household for repairing harness and shoes. Territory for sale. Agents wanted. Address Padon and Van Wormer, West Plains, Missouri. (ag)

FOR SALE.—Design patent No. 35,674, issued February 4, 1902. Dressing case. Will sell outright or to manufacturer on royalty. Case hangs on wall, and is suitable for public and private buildings. Address Lee O. Church, Verne, Knox County, Indiana. (ag)

WANTED.

WANTED.—Agents to sell a good patented article. Address the inventor, W. G. Lee Woods, of John Woods & Sons Bank, San Antonio, Texas. (sep)

WANTED.—Agents all over the United States to control territory and sell our siphons. Would sell the patent outright. No. 697,835. Address Hudson Siphon Company, Lock Box 41, Hudson, Massachusetts. (ag)

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WASHINGTON, AUGUST, 1902.

Go Right On Working.

Ah, yes, the task is hard, 'tis true,
But what's the use of sighing?
They're sorest with their duties through,
Who bravely keep on trying.
There is no advantage to be found
In sorrowing or shirking;
They with success are soonest crowned
Who just go right on working.

Strive patiently and with a will
That shall not be defeated;
Keep singing at your task until
You see it stand completed.
Nor let the clouds of doubt draw near,
Your sky's glad sunshine murling;
Be brave, and fill your heart with cheer,
And just go right on working.

--Success.

American Trade-Marks and Patents in Cuba.

The State Department has received from the legation of Cuba, Washington, under date of July 5, 1902, the announcement of the following decision by the Department of Agriculture, Commerce, and Industry of Cuba, dated June 25, 1902, in respect to the registration of American trade-marks and patents, viz:

Patents and trade-marks of all descriptions, printed matter, titles, and labels, duly registered in the Patent Office of the United States, for whose protection in this island application shall hereafter be made, from this date, by filing the same, shall be registered in the Department of which I have charge, if admissible, upon observing the procedure followed for the registration of those of other countries and upon the payment of \$35 currency for patents and of \$12.50 currency for trade-marks, prints, etc.—that is to say, the same fees as are paid by the other foreign and national marks and patents.

Proposed Changes in French Patent Laws.

A Congress for the protection of patents was recently held at Lille, France. The association which held the congress, was formed some three years ago, for the purpose of obtain-

ing legislation for the protection of patents. The first question considered was the cost of a patent. Under the law of 1844, the cost is about \$100 for a patent running 5 years, \$200 for 10 years, and \$300 for 15 years, or about \$20 per year, payable every 5 years. This tax was declared to be so onerous as to discourage invention, as the author of a simple apparatus, from which it is not likely that large profits will be derived, hesitates to expend \$100 to protect his idea. It was proposed that a uniform progressive tax be substituted, according to the length of time for which the patent may be issued; and that this tax be \$10 for the first year, \$15 for the second, \$20 for the third, \$25 for the fourth, and so on, the tax increasing \$5 yearly until the 15th year, when it would be \$75. A patent that had been used for fifteen years would thus yield over \$600, a far greater revenue than under the present system, but the inventor would not be obliged to pay the heavy sum of \$100 at once. Legislation to this effect will be urged.

Another Prize Competition For Inventors.

There is a prevalent notion among inventors that the U. S. government has posted a standing reward for the solution of perpetual motion. Nearly every practitioner before the Patent Office has probably at some time in his career, been called upon to answer this question.

There is also a notion that the government will aid inventors in developing certain inventions, particularly air ships. While there have been numerous instances where the government has borne the expense of conducting experiments for new inventions, the government has never undertaken to spend any money on perpetual motion and kindred ideas.

The policy of offering prizes seems to be strictly European. Every once and awhile the Germans offer a prize for some particular invention. Some time ago it was for a new automobile for particular use in the army. Now the German association of alcohol manufacturers and the association of agriculturists have jointly offered a prize of 30,000 marks (\$7,143) for the best method of drying potatoes for feed for cattle.

German agriculture has been increasing its potato crop very largely. The technical progress made in cultivating potatoes and the choice of certain kinds yielding a larger crop, have made it apparent that Germany will continue to have a surplus of this vegetable. Already 40 per cent of the total crop is used as fodder; but as potatoes deteriorate after six or seven months, they must be fed within that time. Transportation, also, is expensive, on account of the large percentage of water that potatoes contain. Three and one-half tons of fresh potatoes yield 1 ton of dried ones.

Only those inventions will be admitted to competition that can convert at least 10 tons of raw potatoes into dry potatoes in twelve hours. The produce must not contain more than 14 per cent. of moisture, and must be neither burnt nor tainted with foreign mix-

tures. The potatoes destined for fodder must be digestible, and those destined for distilleries as a substitute for maize, or for pressed-yeast factories as a substitute for corn, must be capable of absorbing sugar easily. Further details as to the prize contest can be had by applying to the "Institut für Gahrungsgewerbe," Berlin, N 65, Seestrass. Notice of entry to the competition must be sent not later than October 1, 1902.

German Patent Decision.

A Berlin photographer, Junk by name, invented some ten years ago a photographic emulsion which had for its purpose the preparation of canvases and papers suited for being painted with oil or water colors, after printing. This object the inventor attained by mixing his gelatine emulsion with a large proportion of starch paste. The German patent granted him was so wide in its claims as to be held by the Courts to cover all photographic bromide papers coated with an emulsion containing starch in any form—notwithstanding the fact that photographic papers containing raw starch had been on the market for twenty years previously. Chief among the photographic papers of this class is the matt-solio of the Kodak Company, and the inventor brought an action against this firm. The suits heard in the matter involved three distinct issues; there was an application for an injunction, another for damages, and a third, brought by the defendant, for annulment of the patent.

Since it is the custom of the German Courts to regard a patent almost in the light of a government decree, the plaintiff was successful in the suit for injunction, and also in the suit for damages, the first of which was carried as far as the Supreme Court. Meantime, the defendant had made the greatest efforts to prove the entire want of novelty in the patent, involving the collection of material in all parts of Europe, and particularly in Spain, where the earliest photographic emulsions, consisting of a combination of gelatine and starch, found their origin. Armed with proofs of this kind, and supported by the testimony of the greatest photographic experts of Europe, the Kodak Company urged the German Patent Office to annul the patent, or at least to restrict its claims. This the Office refused to do, thereby bringing down upon itself the general condemnation of the technical journals throughout the country. One last resort remained to the defendants—an appeal to the Supreme Court. In this, they were entirely successful, all the previous judgments of the Courts being overruled by the total annulment of the patent.

This case has attracted widespread attention, not only in Germany but in other countries, and it has been before the Courts for over four years.

The Adoption of the Metric System.

There is a bill before Congress providing for the exclusive use of the metric system in Government work. It is meeting with strenuous opposition in certain quarters, the Society of Mechanical Engineers having addressed an appeal to its members urging them to use their influence to prevent the passage of the measure. In a letter to *The Electrical World and Engineer*, Mr. Charles T. Porter expresses his views, which seem to fairly reflect the feelings of the opponents of the proposed legislation. He says:

"I propose to show that the English system, employing several units, commensurable with each other, adapted to different uses, and each divided by continual bisections, while making no pretension in that way, is in reality in the highest sense scientific or philosophical; and this by reason of a feature which is wanting in the metric system, and the want of which renders that system unphilosophical, unnatural, and inconvenient for the purpose of mechanical measurement.

"We employ four units of linear measurement—the mile, the yard, the foot, and the inch. Each one of these units has its individuality and a distinctive name. The same is true of the parts obtained by continual bisection. Each of these also has its individuality and distinctive name.

"The problem always is, how can the idea of any distance or dimension be formed in the mind and conveyed to other minds with the greatest distinctness? The answer is obvious. We must employ the largest available unit of measurement, and supplement this, as required, by smaller units, employing the largest available division formed by continual bisection. When the reality can not be expressed in this way, then, and not till then, must we resort to the decimal system of division, the value of which, in this limited field, is beyond all estimation.

"This mode of expression brings the distance or dimension before the mind with a definiteness which can not even be approximated in any other way. This advantage is possessed by the English system of measurement, and is retained by it to the utmost useful limit. Thus, we do not say 17,600 yards, but 10 miles; we do not say 120 inches, but 10 feet. And so universally. By employing the largest suitable unit, we see the distance or the dimension as a vivid reality. We are enabled also to apprehend more clearly the relation to one another of the different members of any construction. We reach correct proportions more readily, are less liable to errors either of design or figuring, and are more likely to detect errors if these are fallen into.

"Is there not power enough in the English-speaking people to defend for their own mechanical engineers the invaluable principle of employing the largest unit of measurement, and, moreover, to make its application as universal for constructive work, as it is for everything else, for the civil engineer, for geographical measurement, for the circle and for time."

SCIENTIFIC

PROGRESS.

New Material for Plastic Art.

"Terralit" is the name given to a new material for plastic art which has recently come into use in Denmark. The inventor is Mr. Ivar Hjort, of Copenhagen, who has experimented with it for the past two years. It is produced by a chemical process, which for the present is of course not made public. A peculiarity of terralit is that it gives the same color and appearance as the original which it is sought to represent, whether the original be copper, marble, bronze, antique bronze, porcelain, or ceramic ware. An exhibit has recently been opened in Copenhagen of forty or fifty of the most celebrated ancient and modern busts, statuettes, and animal figures made of this material. The representations of the bronzes are particularly successful.

Guard for Elevated Railways.

A novel guard for third-rails of elevated railways has been patented by Mr. Sterling Elliott of Boston, Mass., his object being to prevent the falling of sparks upon persons or things below the track. To this end he places upon opposite sides of the rail, upright guards which may be plank, that rest upon the lower rail flanges and extend above the head, being spaced a slight distance therefrom. These guards are held in place by bolts which pass through the rail, suitable spacing collars being interposed between the rail and guards to hold the latter in proper position. As a result, it will be seen that any sparks formed will drop between the guards and thus cannot fall to the street below. Small openings are made at suitable intervals to permit the escape of water.

Calcium Carbids for Electric Arc Lamps.

Mr. Robert Hopfelt, a resident of Berlin, Germany, has been experimenting with different carbids, as for example, calcium carbids, to be used in electric arc lamps. He declares that a much more powerful arc is obtained than by the ordinary carbon electrodes. The difficulty, heretofore, has been that carbids could not be used because they will be decomposed by the moisture in the atmosphere. He has overcome this objection, however, and has obtained a patent in this country on the improvement.

This object is attained by covering the surface of the carbid electrodes with a layer impervious to moisture. Such layer or envelop may consist of certain metals or of a thin layer of varnish or cement or of vitreous coatings, etc. The covering may be advantageously produced by applying metal in the form of a powder, metal salts, or metalloid salts with an organic cement or like binding substance to the electrodes, and then burning them in a furnace. By this burning process, the binding substance is first of all driven off, and then the metals or metal salts melt and cover the electrodes at their surface with a close-fitting impervious layer.

Porcelain Insulators.

Considerable attention has been paid by inventors to the construction of insulators for high potential currents. Several patents have been granted in which the insulators are constructed of several porcelain bells that are nested and connected by a layer of glaze. It is evident that bells which are to be connected together by the glaze must have a thick layer of glaze at their contact-place. As however, the porcelain glaze has a different coefficient of expansion from the mass of the porcelain, it cracks in thick layers—that is to say, after cooling it does not form a homogeneous glaze, but a mass traversed by innumerable fine cracks and pores. These cracks in thick layers of glaze increase under variations of temperature, and further considerably increased in insulators exposed to the atmosphere when a current of very high potential is conveyed over the insulators, whereby the latter are considerably heated.

In order to avoid the above-mentioned drawback, Mr. Rudolf Gaertner, a resident of Merckelsgrun, New Carlsbad, Austria-Hungary, has devised an improvement, for which he has obtained a patent in this country, and has sold his interest in the same to Karlsbader Kaolin-Industrie-Gesellschaft, of Merckelsgrun, near Carlsbad, Bohemia, Austria-Hungary. In the present instance, the separate bells are so connected with one another that an interstice is formed between them in such manner as to provide an air-jacket practically inclosing the inner bell, and thereby the number of the glazed walls and also the space between the cable and the support is increased.

The insulator consists of two bells, and has on its outer bell a projecting edge, which is fixed in a corresponding annular recess in the inner bell in a second heating by means of a layer of glaze, so that between the two bells an interstice or air jacket is formed. As the separate bells are provided with an even thin layer of glaze on their outer and inner surfaces, an insulating layer is provided between the cable and the iron post or support, which is composed of the porcelain, four layers of glaze and the interstice or air jacket.

Manufacturing Stay-Bolts.

Up to the present time it has been the practice to tap the adjacent sheets of the boiler by means of a single tap, whereby the internal threads of the sheets are practically continuous to each other; but no provision has been made for accurately threading the bolt to fit in the apertures, since it has been the custom to separately cut the threads on the ends of the bolt. This cutting of the threads not only prevents the accurate location of the threads with relation to each other to render them continuous in all cases, but provides interstices transverse to the axial line of the bolt, which are liable to extend still farther into the body of the bolt and eventually separate the ends. Mr. George O. Gridley, of Windsor, Vermont, has devised a method of manufacturing stay bolts that will not have these objectionable features, and he has obtained

a patent that covers both the bolt and the method of making it. According to the invention, he threads the two ends of the bolt simultaneously by means which do not cut into the body of the bolt, but compress or compact the outer surface into a tough and durable skin. This is accomplished in the invention by rolling the threads on the bolt between corrugated or threaded plates, whereby in the resulting or finished bolt the threads at both ends are of the same lead or pitch, and are continuous of each other, so that when the bolt is screwed into the sheets of the boiler, the threads on the ends of the bolt accurately register with the internal threads in both the boiler-sheets. By this formation of the bolt, the liability of the bolt to crack at its juncture with or at a point near the boiler sheet, is materially reduced, the outer skin being so compacted or compressed as to be tough, and thus lessen the danger of fracture. Consequently the escape of steam or the leakage of water from the boiler is more effectually prevented than has hitherto been possible with stay-bolts as ordinarily made, for it will be readily seen that whereas in previous constructions the formation of threads by a cutting operation left an incipient crack or fracture at the base of each thread, which soon opened and permitted the leakage of water and steam, the rolling of the threads to form a tough and compacted skin, renders the stay-bolt strong and unlikely to crack and permit such leakage.

Some Early Anticipations of Modern Inventions.

Of Rabelais' story concerning the "frozen words" which startled Pantagruel and his happy crew on the voyage to the oracle of the Holy Bottle, the world has long been familiar. Students of the great humorist maintain that the narrative of the "frozen words" must be taken to imply that their author had something akin to a prophetic vision of the phonograph.

In another direction it now appears that Rabelais played the seer and still nearer approached to a recent invention of unique creation. This relates to the "moving platform," a leading attraction at the Paris Exposition in 1900, by which a passenger stepped on to a traveling road, or path, and was carried to his destination without further effort. If some features of this may be traced, by anticipation, to the mind of the old sage who defined rivers as "roads that travel," the real precedent is discoverable in the fifth book of Rabelais' series of masterpieces.

Rabelais' in the exuberance of his imagination concerning the Isle of Odes, where the roads travel of themselves, depicts Pantagruel and his gay mariners voyaging to the oracle of the Dive Bouteille, on the island of Odes. The term "odes," in spite of its associations, has nothing to do with poetry. On this pleasant isle where the roads travel of themselves, and thus (according to Aristotle's definition), must be classed as animals of locomotion, the traveler had simply to inquire his way to the road which was going to his destination, to get upon it, and so be carried, without further

trouble, to the place he desired. "Just as happens to those who take passage from Lyons down the Rhone to Avignon and Arles."

Who forgets that Mark Twain, some years back, amusingly propounded a similar fancy when he took passage (by slow freight) on a Swiss glacier?

At the present hour the traveling road or path is under experiment in the suburbs of Paris, and is possibly destined some day to supersede omnibuses and tramways.

In the light of these facts it seems hard that Friar Roger Bacon the student of science before the scientific period, who predicted that one day carriages would move without horses, and ships cross the ocean without sails, should be laughed to scorn as an addle-brained monk, whom much learning had made mad.—*Cassier's Magazine*.

New Molding Process.

A new molding process has been devised and patented by Mr. Frederick Baldt, Sr., of Chester, Pa.

The invention is designed to overcome certain objections present in the process usually practiced in foundries at the present time, in which a permanent pattern is first constructed and by which a mold is made. This generally necessitates the dressing of the mold, as well as in most cases the dressing of the casting, to remove, for example, the fins made at the parting-line of the mold. It is also obvious that in foundries where an order for a large number of the same articles are to be filled, considerable time is necessary to produce a large number of these permanent patterns, which necessitates a large number of flasks, etc., and time in making the molds and ramming the same. To overcome these and other objections, the inventor proposes first, to provide a master-mold of the article to be cast, and then to produce from this mold, patterns composed of material that is fusible—at a comparatively low temperature—for example, rosin or other materials of like nature. In this way a large number of patterns can be quickly produced from this master-mold, which is the only one that requires the skill of a pattern-maker in producing.

In carrying out the process the following steps are performed, namely: First, a master-mold is produced, and then a fusible pattern is produced by pouring into this mold, fused material to produce the necessary pattern, it being understood that, as before stated, any suitable material can be employed, but which when hardened can be removed from the mold and handled. Then after this pattern hardens, it is removed and embedded within suitable molding material, such as molders' sand, which is packed around it in the usual manner. Then the pattern is heated to a molten state, and by means of an opening or channel made through the surrounding mold, the material composing the pattern is removed therefrom. After all the material composing the fusible pattern is removed from the mold, the metal from which the article is to be cast is introduced, and after hardening, is removed as a complete and finishing casting.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy: twenty copies for \$1.50.—Please give correct data in ordering.—Address

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Spoons, forks, &c. Handle for.....S. A. Keller
Trimming.....G. H. Taylor
Type. Font of border.....2 pats. H. Barth

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MECHANICAL PATENTS.

Adjustable hanger.....C. L. Olmstead
Adjustable seat and desk.....J. W. Johnston

Air brake mechanism.....W. H. Savage
Amalgamator.....J. V. Coleman
Anchor.....J. E. Rech
Animal trap.....T. D. Vanata
Ankle support.....F. H. Read
Antiseptic bandage.....C. F. Utermohlen
Atomizing apparatus.....J. Robertson
Auger. Twisted.....G. Hallenscheid
Automatic switch.....H. H. Doll et al
Automobile attachment for vehicles.....J. F. Peterman
Awings. Means for operating.....W. S. Bowser
Axle lubricator. Vehicle.....D. W. Smedley
Baby jumper. Collapsible.....A. P. Perkins
Bag holding device.....F. R. Payne
Bale ties. Making.....F. H. Daniels
Bales. Making cotton.....H. Rembert
Baling press.....T. C. West
Ball and socket joint for dolls, &c.....E. Debes
Barrel register.....J. Mauser
Bat or racket for game known as ping-pong or table tennis.....J. Girdwood
Bath apparatus. Electric.....J. D. Randall
Batteries and making same. Active material for storage.....W. E. Winship
Battery connection.....E. A. Sperry
Battery separator plate. Secondary.....A. F. Clark
Bearing. Antifriction.....J. Gottbreht
Bearing. Roller.....W. G. Griffin
Bearing. Self lubricating hub.....T. Thistlewood
Bearing. Shaft.....W. B. Spencer
Bed. Folding.....P. Clay
Bedstead. Invalid.....J. D. Camfield
Beer cooler attachment.....O. Schell
Belt. Waist.....H. J. Gaisman et al
Bicycle driving mechanism.....T. C. Robinson
Bicycle frame. Cushioned.....N. B. Zimmerman
Bicycle lamp lock.....A. Fellows
Bill carrying apparatus. Mechanical.....A. W. Thierkoff
Binder. Loose leaf ledger.....H. H. Hoffmann
Binder. Temporary.....P. Ladewig
Blind stop. Window.....T. A. Upson
Boat lashing device.....S. Nilson
Boats, tow-lines, &c. Safety releasing device for the sheets of.....C. Smith et al
Body brace.....M. W. Russell
Boiler furnace.....H. R. Scott
Boiler water purifying apparatus. Steam.....J. Beha
Boilers. Superheating device in tabular steam.....W. Schmidt et al
Bolster guide block.....N. H. Tunks
Bolt retainer.....G. Lakhovsky
Book. Artist's sketch.....W. T. Sullivan
Bookbinder's clamp.....L. J. A. Staniewicz
Bookbinding machine.....W. G. Joyce, Jr
Book. Manifold (reissue).....A. Levison
Boring machine.....G. de Laval et al
Bottle filling device.....C. T. White
Bottle filling machine.....J. K. Weed
Bottle holder.....E. C. Ludin
Bottle. Non refillable.....E. Fichter
Bottle. Non refillable.....C. F. Mitchell
Bottle stopper.....5 pats. H. S. Brewington
Bottle stopper.....A. Molinari
Bottle washing machine.....J. G. Hehr
Brake.....W. A. Crowds
Brake.....V. Royle
Brake for administering prescribed resistance to the starting movements of hand operated controllers.....W. E. Quimby
Branding iron.....F. Fraunce
Brick or block.....L. A. Brown
Bricking pulverized material. Apparatus for.....T. A. Edison
Bronze mill.....J. A. Prince
Bucket. Well.....H. W. Holmes
Buckle.....R. Porter
Buckle and combination. Adjustable clamp.....F. F. Hodges
Buckles. Means for securing straps to.....F. Woodward
Buggy top adjuster.....J. B. Vliet
Burial case.....C. D. Kooser
Cable testing apparatus.....H. W. Fisher
Calculating machine.....C. Hamann
Camera attachment.....J. L. Jackson
Camera focusing hood. Photographic.....H. C. Hapold
Camera. Photographic.....A. Vautier
Cameras. Automatic shutter operating device for photographic.....F. Bruck
Candle shield and drip catcher.....H. S. Nagengast
Cane stripper.....E. W. Holdsombeck
Canteen.....A. Hall
Cap.....J. E. McLoughlin
Capping machine. Electromagnetic.....L. J. Borie
Car bolster.....H. C. Buhop
Car bolster.....G. P. Ritter
Car brake.....F. W. Rock
Car brake.....J. Plattenburg
Car chock. Railway.....A. D. Faulkner
Car coupling.....J. B. Genin
Car coupling.....J. W. Smith
Car fender. Street.....E. F. Cannon
Car. Freight.....H. R. Keithley
Car loader.....J. L. Roberts
Car wheel.....G. B. Farrell
Car wheel forging apparatus.....A. N. Cameron
Carbons for arc lamps. Manufacture of.....C. R. Boehm
Carburetor.....J. W. Kitten
Carding engine flats. Mechanism for grinding.....J. Fossel
Cart. Dog.....F. & W. Knobel
Cartridge.....R. W. Scott
Cartridge. Gun.....R. W. Scott
Cartridge. Ordnance.....A. Wratzke
Cash register.....A. Gerdes
Cash register.....T. Carroll
Casing head.....C. F. Rigby
Casket lowering device.....H. B. Murdock
Cautery. Electric instrument for.....W. B. Batcheller
Cement fence posts. Making.....E. Davies
Centrifugal machine.....A. Holland
Centrifugal separator.....A. Ten Winkel
Chains, &c. Temporary coupling for.....S. Smith

Chalk, &c. Device for holding.....F. A. C. Rutz
Chatelaine hook.....3 pats. L. B. Prabhar
Child's safety harness.....C. J. Schreck
Chisel. Bush.....J. W. McClure
Christmas tree holder.....F. H. Crum
Cigarette roller.....J. G. Halapleus
Cinder hopper.....M. Laux
Circle cutting device.....E. O. Cartwright
Clock. Electric alarm.....Z. H. Kevorkian
Clock. Electric alarm.....W. E. Throop et al
Clock. Self-winding electric.....& C. M. Crook
Cloth cutting machine.....J. G. & H. H. Grosheim
Clothes drier. Ventilated.....L. F. H. Gundlach
Clothes hook.....C. Salmond
Cock. Ball.....C. Birkery
Cock. Ball.....A. W. Murray
Coffee roaster.....T. M. Ward
Coin controlled device.....H. G. Sweeney
Colliery waste. Utilizing carboniferous.....C. Dorr
Comb cleaner.....S. L. Kistler
Combination wrench.....G. E. R. Rothenbuecher
Commode stool.....W. H. Young
Condenser.....E. Josse
Conduit.....2 pats. W. L. McGowan
Continuous kiln.....W. A. Butler et al
Continuous kiln.....F. B. Swift
Conveyer discharge device.....J. M. Dodge
Corn crib.....J. M. Brokaw
Corset.....N. Temple
Counter skiving machine.....J. R. Scott
Crossing gate.....M. C. Barry
Culinary device.....L. H. Gristle
Cultivator plow attachment.....R. W. Haulbrook
Current wheel.....J. A. Wells et al
Curtain fixture.....E. Flicke
Cyspidor.....R. A. Yochum
Cupule saddle attachment.....J. B. Brooks et al
Dental mouth mirror.....J. Kupfer
Denture. Artificial.....J. E. Dunn
Directory. Vestibule.....F. De Silva
Dish washer.....J. Pettengill
Door check and spring.....V. Beauregard
Door check. Liquid.....H. G. Voight
Door operating device.....P. J. Beisel
Door operating means.....F. Macey
Draft apparatus. Forced.....J. S. Chapman
Draft rigging.....H. C. Prieb
Draft rigging.....J. E. Guinn
Dredger.....R. A. Perry
Drying apparatus.....C. J. Seltzer
Electric accumulator plates. Making.....R. M. Hunter
Electric battery and mounting same.....E. A. Sperry
Electric lighting, &c. Manufacture of braided cords or cables for.....C. Schurmann
Electric motor power transmitting device.....H. S. Miller et al
Electric switch.....A. P. Anderson
Electrical sparking device.....A. C. Brown
Electrolytic cell and electrode therefor.....A. A. Vogelsang
Electroplating apparatus.....T. F. Taylor
Elevator safety stop.....A. Cowperthwait
End gate lock. Wagon.....C. S. Crow
Engine.....G. De Camp et al
Engine indicator.....H. A. C. A. W. Mahak
Engine starting means. Explosive.....S. E. Poole
Engines. Vaporizer for explosive.....J. Lizotte
Engraving machine.....W. E. Crane
Excavator for trenches, cuttings, &c.....E. Schofield
Expansion bolt.....W. U. Griffiths
Explosive engine.....G. Gibbs
Eye guard.....H. W. Brown
Feather quill.....F. Franke
Feed regulator for steam boilers. Automatic.....J. S. V. Bickford
Fence machine. Wire.....P. M. Mishler
Fence post. Metallic.....O. A. Harker, Jr
Fence wire fastener.....M. M. Benster
Ferrule.....C. Perdelwitz
Fibers from reeds, rushes, &c. Producing long and short.....L. v. Ordoly
Files and binders. Transfer frame for letter.....J. F. Cordes
Filtering apparatus.....E. De Meulemeester
Filtering apparatus.....D. Rojat
Fire alarm. Automatic.....M. K. Fred
Firearm. Magazine.....E. P. Bergman et al
Firearm palm rest.....A. Mosbaugher
Fireextinguisher. Automatic.....R. W. Newton
Fire extinguishing apparatus.....J. S. Letts
Fire lighter. Automatic.....A. R. Seaman
Fishing reel.....J. vom Hofe
Flanging press.....W. J. Hagman
Flat iron handle attachment.....H. Greenwood
Fluid regulating device.....J. Hartness
Fog horn.....E. A. Gill
Folding machine.....E. Collon
Fruit grader.....W. C. Anderson
Fruit picking device.....I. Dinger
Furnace.....W. L. Ross
Furnace.....P. Corrigan
Furnaces. Steam and air feeding apparatus for boiler.....J. Marshall
Furniture spring support.....F. E. Ewles
Game board.....S. Schmid
Garbage or refuse can.....2 pats. E. C. Seaman
Garment.....W. P. C. Adams
Garment clasp.....H. S. Brewington
Garment supporter.....W. S. Hunkins
Gas. Apparatus for making oil.....R. Dempster
Gas burner.....S. R. Treen
Gas burner. Acetylene.....J. J. Graf
Gas engine.....E. B. & L. S. Cushman
Gas generating apparatus. Water.....H. Strache
Gas, oil, and water separator.....J. M. Powell
Gas pressure. Instrument for indicator.....M. Arndt
Gas producing apparatus.....J. H. Miller, Jr
Gate.....W. A. Byerly
Gate.....O. B. Jacobs
Gear tumbler.....B. M. W. Hanson et al
Gearing.....E. Jones, Jr
Gearing. Variable speed.....L. T. Weiss
Glass blowing machine.....C. J. Koenig
Glass bodies. Producing hollow.....P. T. Sievert
Glass. Composition for ruby.....R. Zsigmoudy

Golf balls. Manufacture of.....J. P. Cochrane
Gopher trap. Pocket.....J. J. Daniels
Graphophone attachment.....L. H. Chapman
Grate.....T. J. Walton
Greenhouse window operating mechanism.....M. Prior
Grinding attachment for power machines.....E. W. Showalter
Guide. Adjustable.....E. B. Stimpson
Gun carriage.....K. Deinlein
Gun feeding mechanism. Automatic.....A. Vickers
Hair pin.....N. O. Hassum
Hammer. Glazier's.....D. M. McLain
Hammer. Power.....J. B. McLaine
Hand motor.....P. J. Kamper
Harmonic attachment. Mouth.....A. S. Alexander et al
Harness.....A. L. Hawkins
Harness vehicle fastening.....M. McNalley
Harvester. Corn.....F. R. Evers
Harvester frame.....C. S. Hodge
Harvester grain divider.....J. F. Stewart
Hat conformator, stretcher, &c. Combination.....S. Mund
Hat fastener.....M. E. Waples
Hat pin retainer.....E. Krancher
Hats. Making.....J. A. Byers
Hay rack.....P. Plotnik
Hay rake. Sulky.....J. J. Thompson
Heat generator.....G. S. Chase
Heater or boiler.....N. B. Wales
Heating and ventilating system.....J. O. Randall
Heating apparatus. Electrical.....J. R. Quinn
Heel. Metallic she.....H. Hellweg
Hinge joint.....J. J. H. Sturmyer
Hinged gate.....E. Wolverson
Hoop iron. Supporting device for lengths of.....J. McQuiston
Horse detacher.....E. D. Irwin
Hub attaching device.....C. E. Davidson
Hydraulic motor.....J. I. Newburg
Hydrocarbon vapor burner.....J. Johnston
Journal bearing.....J. Swan
Journal box. Ball bearing.....F. E. Manahan
Journal box lid.....H. C. McCarty
Keyless lock.....A. W. Craig
Knitting machine.....D. F. Sullivan
Laboratories, &c. Fitting for.....A. W. Cooksey
Ladder and settee. Combined.....F. D. Allison
Ladder. Extension.....C. H. Schambers
Lamp and socket. Incandescent electric.....J. C. M. Brown
Lamp. Hydrocarbon.....J. Bystrom
Lamp. Incandescent.....H. J. Jaeger
Lamp socket. Electric incandescent.....G. H. Proctor
Lamp. Spirit.....W. J. D. Mast
Last. Sectional shoe.....N. F. Hagstrom
Latch.....J. W. Czermak et al
Latch and lock. Combined.....D. W. Tower
Latch. Sliding door.....G. G. Deffenbaugh
Lath back gearing.....J. Hartness
Lath for turning irregular forms.....F. J. Leland
Lemon squeezer.....A. Baumgarten
Level. Spirit.....J. A. Traut
Life preserver blank.....H. A. Avvad
Limb. Artificial.....E. F. Loeffler
Link motion block.....O. D. Holt
Liquids from solids. Apparatus for separating.....D. Stewart
Loading device.....W. F. Murphy
Lock.....C. Kunzelmann
Lock.....A. F. Wahlberg
Lock.....J. F. Allen
Lock.....C. S. Huntington
Lock.....J. F. Lydon
Log register. Electric.....W. B. Armstrong
Loom beam lock.....O. L. Owen
Loom for weaving velvets.....W. G. Hartley
Loom. Kindergarten.....B. E. Lindberg
Loom. Kindergarten.....J. E. Painter
Loom shuttle binder.....E. S. Stimpson
Loom shuttle driving means.....J. Houston
Loom warp stop motion.....H. A. Owen
Low water alarm. Electric.....E. W. Rider
Lubricator.....J. Gottbreht
Mail box indicator.....C. E. Herd
Mail carrier.....A. L. Mamma
Manifolding sales device.....C. E. Frisbie
Marine brake.....H. Simpson
Match boxing machine.....M. Paridon
Matches. Making.....W. H. Parker
Mattress stuffing machine.....C. W. Johansen
Mattress stuffing machine.....H. W. Pennypacker
Measuring instrument. Lens.....F. Hardinge
Mechanical movement.....H. H. Fefel
Mechanical movement.....J. & C. Quist
Merry go round.....G. D. Bulmer
Merry go round.....C. Looft, Jr
Metal can.....E. P. McColl
Metal sawing apparatus.....C. O. Morgan
Metal wheel.....E. Einfeldt
Metals. Fusion of.....H. A. E. Menne
Milling cutter.....B. M. W. Hansou
Mine ventilator.....P. T. Reynolds
Mineral compound.....M. Arnn
Minerals by the selective action of oil, &c. Apparatus for the separation of.....A. S. Elmore
Moistener.....L. S. Duncan
Molding apparatus.....J. C. Reed
Molding machine.....B. A. Franklin
Motor.....C. M. Kiler
Motors. Protecting device for induction.....J. H. Diggle
Mower.....J. O. Adams et al
Mower attachment. Lawn.....W. J. Gleason
Mowing machine cutter bar.....J. T. Myers
Musical instrument. Stringed.....K. Grienauer
Musical instruments. Playing attachment for key.....H. M. Salzer
Napkin support.....W. R. Walker
Nozzle for urinals. Spray.....W. U. Griffiths
Nut lock.....(reissue).....M. Bartley
Nut lock.....J. Butler
Nut lock.....A. McKinley
Nut lock.....J. W. B. Turk
Nut lock.....J. F. Robinson
Oil burner.....A. H. Fox
Oil burner. Crude.....J. A. Meyer
Oil can.....T. Voita
Oil feeder. Water pressure safety.....J. C. Quinn

Oil vapor engine.....G. Wood
 Oil yieldable or oil containing material. Dry-
 ing.....E. R. Edson
 Orange or lemon cleaner.....J. T. Haley
 Ordnance. Semi automatic breech loading.....
 W. H. Bevans
 Ore crusher and pulverizer.....J. A. Petter
 Packing sliding gate valves. Device for.....
 L. Hirt
 Packing. Stuffing box.....W. Reinhold
 Pail bottom. Milk.....C. S. Crow
 Painting apparatus.....C. L. Bauer
 Painting apparatus.....H. D. Carryl
 Pan lifter.....F. Lombard
 Paper bag machine.....W. I. Baldwin et al
 Paper clip or fastener.....A. Shedlock
 Paper making machine.....C. H. Warner
 Paper making machine.....G. Ehrhart
 Paper pulp strainer.....N. L. Vrooman et al
 Pegging machine horns. Peg cutter for.....
 J. E. Bickford
 Pen.....S. H. Crocker
 Pen. Fountain.....J. Holland
 Pen. Fountain.....W. W. Sanford
 Penholder.....S. H. Crocker
 Pencil sharpener.....W. O'Byrne
 Pencil tip.....L. W. Faber
 Phonograph record supporting device.....
 G. Madison
 Phonograph reproducer.....T. A. Edison
 Photochromoscopic and trichromatic appara-
 tus.....F. E. Ives
 Photograph toning apparatus.....A. Schwarz
 Piano string bearing.....H. McClellan
 Pigeon timing device. Carrier.....E. Buysse
 Pillow brusher.....F. Franke
 Pin tongue safety device.....O. Wentzel
 Pipe bracket. Removable.....F. F. Parsons
 Pipe joint.....W. Kenneally
 Piston ring. Extensible.....O. Johnson
 Placket fastener.....F. A. Cammann
 Placket fastener.....N. R. Taylor et al
 Planter. Check row corn.....W. R. Buchtela
 Plow.....A. K. Goodrich
 Plow.....J. Michalka
 Plow point.....S. C. Myers
 Poke. Animal.....J. I. Barnes
 Poke. Animal.....A. D. Hale
 Poker and tongs. Combined fire.....J. C. Moyer
 Potato digger.....P. Moran
 Potato digger.....P. Hesselius
 Power in varying directions. Apparatus for
 the transmission of.....A. H. Edwards
 Printing frame.....J. M. Smith
 Printing machine. Stencil.....G. H. Davis
 Printing on sheets. Cylinder machine for.....
 W. Spalckhaver
 Printing plate holder.....E. R. Storm
 Printing press.....R. Miehle
 Printing press.....T. M. North
 Printing press feed gage.....E. L. Megill
 Printing press gripper mechanism.....R. Miehle
 Protractor.....W. Quayle
 Pulley lubricator. Loose.....C. S. Scobee
 Pulp strainer screen plate.....N. L. Vrooman et al
 Pulsometer.....P. Haussmann
 Pulverizer.....J. C. Clark
 Pump.....W. F. Garrison
 Pump attachment. Plumber's.....J. Horn
 Pump. Steam.....P. F. Oddie
 Punching machine.....J. Heissenberger
 Punching machines, &c. Locking device for
 use in.....E. B. Stimpson
 Puzzle device.....P. F. De Ford
 Racket.....A. Becker
 Rail clamp.....W. C. Lee et al
 Rail joint.....S. M. Mixel
 Rail systems. Guard for third.....S. Elliott
 Railway goods vans. Sliding door for.....
 A. Fischer
 Railway rail bond. Electric.....E. P. Frederick
 Railway rail stay.....E. Laas et al
 Railway switch.....S. A. Duvall
 Railway switch detector bar.....L. Carrier
 Railway tie.....J. P. Lancaster
 Railway wagons, &c. Coupling for.....
 R. F. C. Rambeaud
 Razor. Safety.....M. H. Standish
 Recording machine.....E. Larena
 Refrigerating apparatus.....J. C. Fox
 Register, ventilator, &c.....H. S. Hart
 Respirator.....L. M. A. Muntz
 Ring.....F. R. Stafford
 Riveting tool. Pneumatic.....J. W. Birkenstock et al
 Road roller. Steam.....T. Wright
 Rock boring machine.....J. Brejcha et al
 Rod coupling. Connecting.....J. Horsely
 Rolling apparatus. Sheet metal.....
 F. O. Stromborg
 Rotary cutters. Manufacturing.....B. Jansen
 Rotary engine.....2 pats.....C. Stuckfield
 Rotary mixer for concrete, &c.....W. J. Judd
 Safety pin.....E. McConnell
 Sash holder.....W. M. Reedy
 Sash holder.....B. D. Berry
 Sash lock.....H. A. Baker
 Sash lock.....A. M. Southard
 Sash lock and lift.....R. H. Price
 Saw set.....C. Morrill
 Scale. Platform.....A. Doering
 Scale. Slide.....J. S. Merritt
 Scales. Stock rack for platform.....C. B. Hurst
 Scraper. Wheeled.....W. S. Livengood
 Screw driver.....J. D. Campbell et al
 Screw. Spur shore.....W. S. Rendle
 Sealing device. Bottle.....G. A. Brooks
 Semaphore.....A. C. Johnson
 Sewed articles. Covered seam for.....C. McNeil
 Sewing machine cutting attachment.....G. S. Hill
 Sew machine feeding mechanism.....
 L. Onderdonk
 Sewing machine needle.....F. W. Merrick
 Sewing machine stitch forming mechanism.....
 2 pats.....L. Onderdonk
 Shade and fixture. Window.....J. Eckert
 Shade hanger. Window.....S. Blaustein
 Shadowgraph.....J. G. Hirsch
 Shaft coupling. Flexible.....G. C. Hicks Jr
 Shaft shackle. Vehicle.....2 pats.....S. R. Bailey
 Sheet. Reversible suspended flexible.....
 W. E. Elam
 Shingling bracket.....M. Choquette
 Shirt.....M. P. Magly
 Shoe form or last.....H. B. Walker
 Show top.....C. H. Goldman
 Shredder snapping rolls.....E. E. Jones
 Signal system. Telegraphically operated.....
 J. N. Newson
 Signaling. Semaphore indicator for electric.....
 H. Gullver

Signaling apparatus. Pneumatic.....J. H. Brady
 Sleeve holder.....A. J. Barber
 Sleigh.....P. R. Gwyn
 Sleigh runner.....W. N. Williams
 Sleigh runner. Detachable.....W. W. Topliff
 Socket cover and globe holder.....J. F. Wride
 Socket wrench. Adjustable.....J. L. Paxson
 Spike puller.....N. F. Murphy
 Spoke setting machine.....G. P. Yeakel
 Spring motor.....A. Bender
 Springless hook. Self locking.....D. E. Barton
 Squeezer.....A. Baumgarten
 Stacker. Straw.....C. B. Hazard
 Stamp mill tappet.....J. C. H. Vaught
 Steam boiler.....P. P. Altman
 Steam generator.....W. Roussanoff
 Steel. Manufacture of crucible.....E. B. Clarke
 Steering gear.....W. A. Crowder
 Stencils from which music sheets are printed.
 Machine for forming.....G. H. Davis
 Stiffening band.....H. H. Taylor
 Stich separating machine.....3 pats.....
 J. B. Hadaway
 Stocker. Mechanical.....A. F. Nagle
 Stone and forming articles therefrom. Mak-
 ing artificial.....G. P. Chappell
 Stone molding machine. Artificial.....
 N. F. Palmer
 Storage battery.....M. O. Smith
 Stove grate.....T. Partridge, Jr
 Stovepipe.....C. C. Halstead
 Sugar. Apparatus for the manufacture of.....
 J. A. Morrell
 Sugar boiling.....C. Steffen
 Summer house.....G. R. Lockwood
 Suspenders and trousers connection.....
 R. T. Clarke
 Switch.....S. J. Harris
 Switch safety appliance.....S. J. Harris
 Syringe. Vaginal.....2 pats.....N. C. E. Schwartz
 Tab cutting machine.....E. B. Stimpson
 Tag.....C. B. Fairchild
 Tea or coffee pot.....F. A. Harrison
 Telegraphic code.....J. E. Dempsey
 Telegraphy. Electric.....S. G. Brown
 Telegraphy. Wireless.....2 pats.....
 H. Shoemaker
 Telephone switchboard supervisory signal.....
 reissue.....C. E. Scriber
 Theatrical scenery.....L. J. Carter
 Thill coupling.....L. G. Sprague
 Tie plating machine.....G. L. Bender
 Tie plug or dowel.....W. M. Fridericia
 Tiles. Laying.....E. S. Hutchinson
 Tire. Rubber.....W. R. Harris
 Tool. Compound.....J. F. Koelmel
 Toy.....J. Jackson
 Toy.....H. Jensen
 Traction engine.....J. O. Wells
 Trap.....J. W. Zehring
 Trap or separator.....G. I. Roberts
 Tripod. Portable.....C. Whetham
 Trolley. Electric car.....J. C. Johnson et al
 Trolley fork.....E. L. Gentis
 Trolley. Overhead.....G. H. Russell
 Trolley pole.....J. D. Hickman
 Trolley wheel.....2 pats.....W. F. Hall
 Trolley wheels for leaving the feed wire. Ap-
 paratus for preventing.....G. W. Hammond
 Trousers guard.....J. H. Hardy
 Truck. Elevating.....A. A. Scott
 Truss. Hernial.....L. A. Stewart
 Turtle trap.....E. J. Rusk
 Twine cutter.....I. Shafer
 Type writer.....W. H. Young
 Type writing machine.....M. W. Weir
 Type writing machine.....G. B. Webb
 Type writing machine line spacing lock mech-
 anism.....R. J. Fisher
 Type writing machine line spacing mechanism.....
 C. F. Laganke
 Umbrella drip cup.....P. W. Pray
 Umbrella frame.....S. S. Fretz
 Valve.....C. P. Lynch
 Valve. Air and vacuum.....E. P. Allen
 Valve attachment for traps. Air.....C. A. Tilly
 Valve. Engineer's brake.....P. Synnestvedt
 Valve for reservoirs containing fluid under
 pressure. Relief.....H. E. Warren
 Valve gear. Reversing.....K. C. Geele
 Valve gear. Slide.....S. S. Youngband
 Valve. Stop.....J. A. Ellison
 Vapor burner.....A. Lecomte
 Vegetable cutter.....J. C. Ivey, Sr
 Vehicle.....J. Krauss
 Vehicle driving gear. Motor.....E. E. Wright
 Vehicle. Motor.....W. Maybach
 Vehicle. Motor.....G. E. De Long
 Vehicle running gear. Motor.....F. J. Stallings
 Vehicle. Self propelled.....E. R. Gill
 Vehicles. Expandable pulley for motor.....
 P. I. Viel
 Vehicles. Mechanism for electric propulsion
 of road.....D. S. Bergin
 Ventilator.....T. M. Carpenter et al
 Vessels. Construction of composite.....E. Hayes
 Veterinary surgeon's float.....3 pats.....P. J. Weder
 Vise.....C. D. Bingham
 Vise. Rapid acting.....H. D. Chipman
 Voting machine.....C. F. Harrington
 Wagon seat support.....M. Stangel
 Waistcoat.....E. G. D. Wade
 Wall covering. Embossed.....R. Volker
 Wall nail.....A. Hofmann
 Warper stop motion mechanism.....A. E. Rhoades
 Washing machine.....J. Knoche
 Washing machine.....J. P. Gordon
 Water heater.....H. W. O'Dowd
 Water meter.....H. F. Brown
 Water purifier.....C. C. Clark
 Water purifying apparatus.....C. L. Kennicott
 Weaner. Calf.....G. W. Moody
 Weaving diagrams. Producing.....3 pats.....
 J. Szczepanik
 Weighing machine.....D. S. Cook
 Weighing machine. Rotary.....P. B. Clarke
 Whip.....M. O. Felker
 Wind motor.....J. M. Cochran
 Window.....E. Kraft
 Window support. Casement.....A. Gnezda et al
 Wire rope machine.....E. P. Frederick
 Wood impregnating apparatus.....J. Borner
 Wrench.....A. Bivins
 Wrench.....G. W. Boozier
 Wrench.....J. C. Davison
 Yoke attachment. Neck.....D. N. Luse
 Zinc ores and especially blende. Electrometal-
 lurgical treatment of.....C. J. Tossizza
 DESIGNS.
 Pillow. Sofa.....E. Field

Scale base and supporting column.....
 W. H. Sargent
 Scale beam support.....W. H. Sargent
 Type. Font of border.....J. W. Phinney

Issued July 8, 1902.

MECHANICAL PATENTS.

Acid. Apparatus for making sulfurous.....
 W. Wenzel
 Advertising device. Wind actuated.....
 C. G. Cribbs et al
 Aging or treating spirits.....R. C. Scott
 Air compressor. Hydraulic.....W. J. Linton
 Alkali metal sulfates from mixed solutions.
 Separating.....C. Hoepfner
 Ammonia compressor.....J. T. Ludlow
 Ammunition and water carrier and litter.
 Combined.....H. F. L. Allen
 Ammunition and water carrier and lifter.
 Portable.....H. F. L. Allen
 Animal trap.....J. S. Moon
 Antimony oxid. Making white.....A. S. Plews
 Automatic lubricator.....A. A. Freeman
 Automobile.....J. D. Carrington
 Awning fixtures. Antiattler for.....J. Sullivan
 Axle box. Car.....O. Newhouse
 Axle lubricator.....R. H. Gowan
 Axle. Vehicle.....G. Heck
 Bag filling machine.....J. L. Drohen
 Bag holder.....W. Hayward
 Bale tie.....W. T. Johnson
 Balls. Making playing.....E. Kempshall
 Balls. Manufacturing playing.....E. Kempshall
 Barrel finishing machine.....G. M. Carter
 Barrel. Wrought metal.....E. C. Phillips
 Batteries and product thereof. Making plates
 for storage.....H. K. Hess
 Battery.....W. T. Seddon
 Bed bottom.....P. B. Rooney
 Bed bottom. Spring.....C. B. & F. White
 Bed rail.....W. Tucker
 Bell.....W. B. Augir
 Belt fastener, clasp, or buckle.....M. Cochran
 Belt tightener.....G. A. Schwingel
 Bib.....H. Newlin
 Bicycle.....O. W. Griffiths
 Bicycle.....H. B. Gillis
 Bicycle.....A. G. Anderson
 Bicycle attachment.....F. W. Talley
 Bicycle handle bar.....W. N. & W. N. Whitely, Jr
 Bicycle support.....R. O. Wilcox
 Bicycles. Auxiliary hand operated driving
 mechanism for.....K. Wunner
 Bilge block.....J. McCullough
 Blasting cartridge.....W. Kirsanov
 Bleaching vat.....F. Taylor et al
 Blower and compressor.....C. Neumann
 Boards. Stacking of.....G. Johnson, Jr
 Boiler furnace. Steam.....H. B. Meech
 Bolster.....E. Carison et al
 Book. Account.....C. K. Rosenberg
 Boring apparatus. Hydraulic.....G. Schmidt
 Boring tool. Expandable.....H. Liethegener
 Bottle filling and stoppering machine.....P. Bins
 Bottle or flask.....E. D. Read
 Bottle or jar.....E. L. Livingstone
 Bottles or jugs with beer. Apparatus for fil-
 ling.....A. Schroedter
 Box.....E. O. Clark
 Bracelet or the like.....E. P. Davis
 Brake.....J. G. Alexander
 Brake mechanism.....O. F. Randall
 Brake shoe.....G. A. Woodman
 Brick kiln.....T. M. Wilson
 Broom head.....W. Mansfield
 Buggy boot or apron.....H. A. Sorensen
 Building material.....M. W. Marsden
 Burglar alarm.....P. W. Dunne
 Burglar alarm.....C. Fruehauf
 Bustle.....H. H. Taylor
 Button machine.....T. F. Morrissey
 Calendar.....C. L. Post
 Camera.....C. E. Hutchings
 Camera attachment. Photographic.....
 J. A. Robertson et al
 Camera. Panoramic hand.....N. Conti
 Camera. Photographic.....C. E. Hutchings
 Camera. Photographic.....H. F. Purser
 Camera with roll film magazine. Folding.....
 C. P. Goerz
 Can body forming machine.....W. S. Case
 Car ending or heading machine.....
 J. G. Hodgson et al
 Can head delivering apparatus.....H. N. Norton
 Can or jar cover attachment. Fruit.....
 G. E. Woodbury
 Can testing machine.....H. N. Norton
 Can testing machine.....W. H. H. Stevenson
 Can testing machine.....G. F. Leiger
 Canning food products.....J. G. Hodgson
 Candy dipping machine.....F. Goldschmidt
 Cane. Magazine torpedo.....J. H. Fox
 Car brake. Ratchet.....H. Witte
 Car coupling.....2 pats.....J. B. Thomas
 Car fender.....J. T. Hodgins
 Car fender. Street.....C. T. Stoelting
 Car fender. Street.....C. Zimmerman
 Car guard gate. Railway.....H. Witte
 Car guard rail. Street.....W. S. Bradley
 Car side bearing. Railway.....C. F. Huntton
 Car side bearing. Railway.....S. Northrop et al
 Car. Tramway.....A. Maurer
 Car wheel holding device.....E. C. Deskin
 Cars. Haud strap for street railway.....
 M. Straus
 Carbureter.....W. S. Head et al
 Carriage top backstay.....R. C. Schemmel
 Carton. Collapsible.....C. H. Russell
 Cashing sales accounts. Means for.....
 F. E. Anderson
 Cask closing means.....J. J. Henningsen
 Chain making apparatus.....J. Girtol
 Chair attachment.....A. M. Richards
 Chair brace.....A. Gruenwald
 Chatelaine clasp.....J. Ritter
 Chenille. Woven.....T. F. & A. Naylor
 Chuck. Rock drill.....M. McHale et al
 Churn power.....J. A. Maddox
 Cigar maker's board.....A. C. Cambridge
 Cigar or cigarette lighting device.....R. Wilson
 Clock. Program.....O. D. Rice
 Clock. Self winding.....C. Hurst
 Clothes line prop head.....J. G. Moie
 Clothes line support.....M. T. Gordon et al
 Cock for gas burners. Stop.....G. D. Gibbs
 Cock. Self closing.....P. Schwegel
 Coin actuated machine.....P. S. Gattolliat

Composing machine keyboard attachment.....
 D. W. Fratcher
 Computing machine.....E. Roenius
 Cooking eggs. Means or apparatus for.....
 L. H. Stocks
 Copy holder.....W. R. Fox
 Corset.....J. E. Doolittle
 Crane. Electric locomotive.....G. M. Brill
 Crank hanger.....W. B. Spencer
 Crayon sharpener.....A. P. Peterson
 Crib and table. Combined.....H. G. Doran
 Cuff holder.....F. J. Roberts
 Cultivator.....C. W. Sleeter
 Cultivator.....J. D. Riddle
 Cupellation furnace.....D. Laird
 Curler. Hair.....A. G. B. Seuri
 Currents. Means for changing the tension of.....
 W. M. Fairfax
 Curtain fixture.....S. T. Nakashjian
 Curtain pole and shade roller bracket.....
 C. L. Lyons
 Cutting woven threads. Machine for.....
 J. P. Brophy
 Damper. Stove.....E. M. Gleason
 Dams. Building.....A. D. Foote
 Desk.....C. F. Deplanty
 Disinfecting apparatus.....W. H. Francis
 Display case.....F. B. Deiter
 Display rack.....W. White
 Display rack or stand. Collapsible.....
 F. C. Johnston et al
 Door bolt.....E. Fages
 Doors. Means for preventing dust, draft, and
 rain from entering under.....J. Crowther
 Draft equalizer.....B. Creplin
 Dredge. Hydraulic.....L. W. Bates
 Drills. Water attachment for power.....
 F. L. Whitehead
 Driving mechanism.....A. F. Spaulding
 Drums and symbols. Pedal device for bass.....
 W. C. L. Evans
 Dyeing apparatus.....R. Illingworth et al
 Dyeing apparatus.....R. Weiss
 Electric circuit thermal protector.....F. B. Cook
 Electric cut out.....G. N. Gehmen
 Electric distribution system.....C. J. A. Michaelke
 Electric motor regulation.....O. H. & A. F. Pieper
 Electric motors. Protective operating device
 for.....A. C. Eastwood
 Electric wires in buildings. Junction box for
2 pats.....B. W. Allen
 Electric wires. Wall plate or shield for.....
 B. W. Allen
 Electrical apparatus. Circuit closer for port-
 able.....W. Roche
 Electrical transportation system.....H. F. Freed
 Electrode. Battery.....T. A. Edison
 Elevator boot or housing. Pneumatic.....
 C. Bradford
 Elevator controlling system. Electric.....
 2 pats.....J. D. Ihlder
 Elevator safety device.....W. H. Wilsey
 Endless chain reel.....J. M. Dunahoo
 Engine regulators. Controlling mechanism
 for steam.....E. Reynolds
 Engraving machine.....R. Jay
 Eyelet.....reissue.....J. C. Rhodes
 Face protector.....M. Galley
 Facing and binding. Skirt.....W. J. Hay
 Fan case for blast fans.....J. T. Hope
 Fastening device. String.....E. Flowers
 Feed water, burner, or like regulator.....
 J. Johnston
 Feed water heater and condenser.....
 H. A. Ferguson
 Fence making machine.....E. E. Stewart
 Fence. Portable.....J. Steiner
 Fence post.....A. Henry
 Fibrous substances. Treating.....E. T. Holmes
 Filling indicator.....L. F. Doelinger
 Finger ring.....N. Rosen
 Firearm single trigger.....E. D. Fulford
 Firearm single trigger mechanism.....
 E. D. Fulford
 Fire escape.....G. P. Nice et al
 Fire escape.....C. Seesle
 Fishing rod line guide.....E. C. & E. M. Cattley
 Fly screen attachment.....A. M. Nelson
 Flying machine.....J. T. Rice
 Folding box.....B. B. McFadden
 Food guard.....A. M. Stadelman
 Formaldehyde. Composition for the produc-
 tion of vapors of.....J. J. A. Trillat
 Furnace.....C. Phillips
 Furnaces for progressive metal heating.....
 T. V. Allis
 Furaces. Apparatus for recovering minerals
 carried off in the fumes for smelting.....
 W. R. Lee
 Galvanic battery. Reversible.....3 pats.....
 T. A. Edison
 Game apparatus.....M. R. Wright
 Game counter.....E. T. Van Gieson
 Garbage burner. Domestic.....F. E. McGurran
 Gas. Apparatus for making carbonic acid or
 other.....V. W. Riesberg
 Gas generator.....F. E. Caton et al
 Gas generator. Acetylene.....J. L. Harris
 Gas generator. Acetylene.....A. Winch
 Gas lighting mechanism. Automatic.....
 A. B. Shaw
 Gear. Friction draft.....G. P. Ritter
 Gearing.....C. H. Pelton
 Glass articles. Apparatus for the manufacture
 of molded hollow.....P. T. Sievert
 Glass bottle making machine.....C. Leister
 Glass. Framing.....J. Taluau et al
 Glass. Framing.....J. Taluau
 Glass tank.....L. Houze
 Glass window or similar object and making
 same. Stained.....J. Taluau
 Gold saving machine.....C. Ramos
 Golf balls. Manufacture of.....E. Kempshall
 Governor. Steam engine.....R. J. Patterson
 Grader. Road.....J. H. Aldrich
 Grinding device.....S. P. Hastings
 Grinding machine.....J. N. Lapointe
 Grinding mill.....H. G. Johnson
 Hammer.....J. Dempsey
 Hammer. Magazine nailing.....G. I. Smith
 Harvester divider.....J. Macphail
 Hasp fastener.....A. L. Weston
 Hat box.....J. M. Bird
 Hearse.....D. Johnston
 Heater.....A. H. Humphrey
 Heating system. Hot water.....J. Ebersole
 Heddle frame.....T. J. Fuyat
 Heel front abrading machine. Shoe.....
 J. G. Buzzell
 Hides or skins. Machine for treating.....
 F. J. Perkins et al

Hinge.....C. H. McCauley
Hinge. Spring butt.....T. H. Penty et al
Hoisting device.....E. Stowell
Hoisting machine control device.....G. H. Reynolds
Hoists or elevators. Controlling system for electric.....A. E. Maccoun
Horse holding device.....M. Lopisch
Horseshoe.....F. N. Cline
Horseshoe machine.....M. J. Kelly
Hose or like pipes. Apparatus for cleaning the interior of.....S. Hyden et al
Hose supporter hook.....M. B. Hammond
Hot air furnace.....G. H. Fouts
Hub drilling machine. Metallic.....G. H. Everson
Hub runner. Adjustable.....F. O. Bailey
Ice runway.....F. H. & C. H. Eichhorn et al
Igniter.....C. A. Wilkinson
Insect trap.....H. A. Bierley
Insecticide and fertilizer.....J. A. Emig et al
Insulator.....J. E. Calvin
Internal combustion engine.....F. Lister
Iron, manganese, and alloys of these metals by aid of electricity. Manufacture of.....A. Simon
Jar cover repairing tool.....L. Sarr
Journal bearing and air compressor. Combined.....C. F. Du Bois
Knee joint or hinge connection.....G. W. Greenwood
Knots. Device for untying hard.....J. W. Mutton
Label holder fastener.....J. R. Thorpe
Lacing device.....E. Savoye
Lacing stud.....L. L. Russell
Ladder.....R. L. Scott
Lamp.....F. J. Cleare
Lamp burner.....H. H. Zimmerman
Lamp. Incandescent gas.....L. T. Alton
Lamp supporting device. Electric.....W. F. Brewster
Lasting machine. Pneumatic.....C. K. Pickles
Lath auxiliary appliance.....S. H. Croker
Lathing. Metallic.....F. A. Mitchell
Leaf holder.....C. P. Weaver
Leather lace cutter.....G. O. Bjorkander
Leathers. Varnish for making enamel or patent.....H. C. McKay
Ledge.....J. B. Winn
Lemon squeezer.....J. G. Bulloch
Letter sheet and envelop. Combined.....H. V. Wagoner
Leucogalloycyanin and making same.....C. De la Harpe
Level and plumb. Combined.....R. W. Pratt
Level. Gravity.....G. Seyfarth
Life preserver.....G. B. Conley
Linoleum. Machine for the manufacture of inland.....D. N. Melvin
Liquid delivery apparatus.....P. Sheedy et al
Loading apparatus.....J. Straub
Loads. Means for moving heavy.....A. Schulz
Lock.....A. R. Fergusson
Locomotive cylinder circulator.....P. Sheedy et al
Locomotive sanding device.....J. C. Hooper
Loom. Narrow ware.....J. C. Brooks
Loom shuttle.....L. W. Campbell
Loom take up.....F. C. Gerfin
Loom. Weft replenishing.....W. E. Moore et al
Looms at intervals. Means for stopping.....G. A. Cluff
Magneto therapeutic apparatus.....J. Burry
Matches. Making.....W. H. Parker
Measuring instrument.....G. J. Luck
Metal sheets in packs. Compound for use in reducing.....T. V. Allis
Metal sheets. Producing.....T. V. Allis
Milling machine.....G. W. Smith et al
Molding machine. Sand.....J. J. McClelland
Mop holder and wringer. 2 pats.....A. W. Smith
Motion. Means for transmitting rotary.....P. W. Dunne
Music holder.....A. D. Crist
Music retainer. Sheet.....J. Rawlins
Nut lock.....G. H. Layng
Nut lock.....F. K. Popplewell
Nut lock.....R. D. Hughes
Nut. Lock.....P. J. Wilson
Oil. Apparatus for separating naphtha from.....E. R. Edson
Oil burner.....E. B. Raymond
Ophthalmometer. Refracto.....H. Van Patton
Ore testing tablet.....H. E. Way
Ores. Apparatus for concentrating magnetic iron.....T. A. Edison
Oven. Knockdown.....S. A. Henry
Oven. Knockdown.....W. H. Dahman
Package carrier.....O. M. Pond
Paddle wheel.....2 pats.....F. Exline
Padlock.....F. W. Pinson
Pail. Wash.....F. E. Libenow
Paper coating machine.....J. Chevalier et al
Paper cutting and collating machine.....W. Y. Dear
Paper feeder.....E. Dummer
Paper machine couch roll attachment.....F. E. McEvoy
Pen. Fountain.....W. E. Lindsay
Perspectograph.....O. Eichenberger
Photographic or similar apparatus. Adjustable support for.....P. Thill
Photographic prints. Revolving trimmer for.....J. Matheis
Photographic view finder.....J. A. Robertson et al
Pianoforte wrist supporting attachment.....A. M. Jones
Pick. Coal.....F. Horn
Pipe or conduit.....A. W. Cooksey
Plant protector.....J. W. Ross
Plow. Riding.....C. S. Ruef et al
Plow. Wheel.....B. Cross
Pot for containing shellac, &c.....W. L. Morris
Potato digger.....J. L. Ingersoll
Potato digging machine.....F. O. Andrews
Printing apparatus. Blue.....S. B. Whinery
Printing press.....W. Scott
Printing press envelop feeder.....M. W. Lilly
Prints. Machine for making blue.....R. A. Bell
Projecting apparatus.....R. H. Edwards
Propelling device. Boat.....F. J. Gleason
Pulley and band power transmitting appliance.....J. Moorhouse
Pump. Centrifugal.....H. Sulzer
Pump. Rotary.....W. W. Wainwright
Pump suction pipe strainer.....W. R. Emerson
Pump. Wave motion.....E. Chaquette
Pumping engine. Condensing.....F. M. Leavitt
Punch and shears. Combined.....J. F. Kidd
Push and switch. Electrical.....E. G. Harcourt et al
Puzzle.....J. H. O'Brien
Racking apparatus.....D. Beebe

Rail fastener.....J. M. Spaulding
Rail joint.....T. Huberdeau
Railway bumping post.....P. Scanlin
Railway contact system. Electric.....2 pats.....T. B. Patch
Railway rail joint.....W. J. Austin
Railway sander.....J. Quinn
Railway semaphore, &c.....W. D. Farren
Railway signaling system.....A. W. Kneel
Railway switch.....W. Wharton, Jr
Railway switches and signals. Electrical apparatus for operating.....T. Ducousso
Railway tie.....B. H. Smith
Railway wagons in loading or unloading. Apparatus for controlling.....J. D. Miller et al
Railways. Automatic stop signal for.....T. T. Chaloner
Rake and stacker. Combined.....J. H. Kindsvater
Reclining chair. Adjustable.....J. E. Hanger
Refrigerating plants. Ammonia purifier for.....J. Scheideman
Refrigerating plants. Purifying refrigerants in circulation.....J. Scheideman
Refrigerator car ice tank.....T. B. Kirby
Reminder system. Perpetual.....B. Pirosh
Respirator.....G. L. Fowler
Rheostat.....A. C. Eastwood
Rope grip for snaffling.....J. H. Wallace
Rotary engine.....A. T. Stimson
Rotary motor.....T. U. Gray
Rule.....E. M. Gerardin
Safety device.....A. Sundh
Sash balance connection.....A. Weingaertner
Sash fastener.....A. Brauer
Sash lock.....J. A. Espitalier
Sash lock.....C. Stimpson
Sawing machine.....P. P. Batte
Screen.....G. W. Cross
Seal lock.....C. J. Reynolds
Sealing cap for bottles. Sheet metal.....N. B. Abbott
Sealing wax can. Tin.....W. E. Moyer
Semaphore signal. Automatic electric.....J. N. Harper
Separator.....F. Cutler
Sewing and welt beveling machine. Shoe.....2 pats.....J. B. Hadaway
Sewing machine feeding mechanism.....D. M. Smyth
Sewing machine guide.....A. Lennox
Sewing machine overseaming and blindstitching attachment.....W. D. Beam
Sewing machine shuttle.....H. R. Tracy
Sewing machine take up.....J. M. Chauvet et al
Shaft cross bar. Vehicle.....S. H. Hayden et al
Sharpening machine.....F. A. Reichardt et al
Sheep trail.....J. Cherpaw et al
Sheet metal bailed can or vessel.....B. H. Larkin
Sheet metal vessel spout brace.....C. L. Wagandt
Shelf. Bracket.....R. R. Walker
Ships. Mooring.....W. M. Walters
Shirt vest.....G. W. Sheckells
Shoe upper fastener.....W. E. Ellis
Show case.....J. S. Lewis et al
Sign. Illuminated display.....C. C. Scott
Signaling system.....J. J. Ruddick
Skirt retainer.....M. C. Huffman
Smoke preventing furnace.....2 pats.....H. F. Hayden
Soap.....H. C. Peffer
Soldering machine. Can.....J. G. Hodgson et al
Soldering machine for sheet metal cans. Automatic side seam.....J. G. Hodgson et al
Sound recording and reproducing device.....E. R. Johnson
Spark preventer for locomotive or other engines.....D. Drummond
Speed regulating and reversing device for power transmitting mechanism.....F. H. Bates
Spool for sand reels, &c.....K. Chickering
Square. Carpenter's folding.....E. J. Morrell
Staking machine.....F. J. Perkins
Stamp. Hand.....L. J. Hendershott
Stamp. Hand.....J. Durand
Starch or other amylaceous substances. Manufacturing rice.....E. Leconte et al
Station indicator.....H. T. Smith et al
Steam and oil separator.....E. Friesdorf
Steam plant purge feeding apparatus.....J. Angell
Steering and braking device.....C. F. Weeber, Jr
Stirrup.....C. W. Gillespie
Stove.....E. J. Lahan
Stove. Gas.....H. Bonson
Stove. Heating.....L. Howard
Stove. Heating.....J. L. Bangley
Sugar juices. Purifying.....H. Gouthiere
Surgical instrument hinge.....C. J. Pilling et al
Suspenders.....C. Bloomberg
Swing.....A. C. Jacobs
Switch and lightning arrester. Combined.....W. J. Bell
Switch motor. Reversing.....J. D. Ihlder
Switch stand attachment.....H. F. Ong
Switching apparatus.....C. Michalke
Taper grinding device.....W. Y. Allen
Telegraph.....C. E. Fritts
Telegraph and telephone signal. Combined district.....C. Selden
Telegraphic safety device.....S. R. Wright
Telephone toll line coin collector.....J. J. O'Connell
Tellurian.....J. A. B. Lovett
Tension device.....H. A. Webster
Thermoset.....A. Roesch
Thill coupling antirattler.....J. E. Whitney
Threshold. Automatic.....C. R. Snowden
Time recorder. Workman's.....A. L. Jaynes
Tires before fitting them into their rims. Means for longitudinally compressing wired on cushion.....G. Robson
Tobacco box and cutter. Combined.....F. Laporte et al
Tobacco hanger.....W. M. Ketchin
Torpedo and means for propelling same.....A. Klinger
Toy. Aerial.....F. M. Osgood
Toy bank.....O. G. Crannell
Toy milk wagon.....H. T. Kingsbury
Toy. Musical.....H. P. Brown
Train manipulation. System of.....L. A. & C. I. Freedman
Training apparatus.....J. McMaster
Tree limb support.....S. T. Hall
Truck. Baggage.....G. W. Burton
Truck. Car.....B. Haskell
Tube drawing machine.....J. Giesholdt
Type carrier action and means for mounting same.....F. X. Wagner
Type writer cover.....H. P. Childress
Typewriter hammer mechanism.....S. J. Seifried
Typewriter's copy holder.....A. Ryden

Type writing machine.....R. M. Bullard
Type writing machine.....T. D. Robinson
Type writing machine.....N. C. Darrow
Type writing machine platens. Follower plate for.....C. F. Laganke
Umbrella runner retainer.....W. S. Seymour
Valve.....N. Z. Norrington
Valve. Flushing.....J. O. Rathbun
Valve. Tank.....S. J. Asbell
Vehicle body.....C. F. Putnam
Vehicle brake.....C. B. Fairchild
Vehicle brake. Automatic.....E. G. Stone
Vehicle propelling means.....A. Rieber
Vehicle. Steam propelled.....2 pats.....H. K. Hess
Vehicle steering and controlling device. Road.....M. D. Porter
Vehicle wheel. Motor.....G. O. Venner
Velocipede and wagon. Combined.....E. L. Hoy
Vending apparatus. Newspaper.....L. C. Overpeck
Vending machine. Coin operated.....P. G. MacLean
Veneer slicer.....J. N. Roberts
Ventilator and mirror protector.....W. C. McBride
Vessel. Bulk cargo.....J. R. Oldham
Voltage regulator.....T. M. Pusey
Wagon. Dump.....B. H. Gleason
Washstands, bath tubs, &c. Fixture for.....A. P. Windolph
Washing machine.....E. F. Miller
Watch dial illuminator.....F. M. Durkee
Watch protector.....F. A. Chervenka
Water closet ventilator attachment.....S. C. Brown
Water heating apparatus.....E. W. Higbee
Water purifying apparatus.....J. Davis
Water wheel.....S. M. Thurman
Wave motor.....E. Chaquette
Weeding implement.....B. Sandle
Weighing apparatus.....J. Manes
Weighing machine. Automatic.....F. Berto
Well rig.....E. A. Hardison
Wells. Expanding reamer for oil or Artesian.....J. P. Smith
Wheel.....W. T. M. Brunnemer
Windmill.....L. A. Haight
Wire. Weaving.....C. W. James
Wood fluting machine.....E. Rawson
Wood working machine.....F. Dudek et al
Woodworking machine pressure device.....J. R. Thomas
Wrench.....E. L. Utley

DESIGNS.

Badge.....A. E. Lyon
Bottle.....W. M. McCormick
Box. Paper.....P. B. Myers
Spoons, forks, &c. Handle for.....2 pats.....H. Hilbom

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MECHANICAL PATENTS.

Acid from sulfur dioxide in aqueous solution by electrolysis. Manufacturing sulfuric.....C. B. Jacobs
Adding machine.....A. C. Schuman
Adjustable stand.....G. A. Wadsworth
Air and gas mixer.....J. Seymour
Air brake apparatus.....E. P. Donnelly
Air pressure regulator.....J. H. Dickinson
Ammunition hoist for ordnance.....E. Trochain
Armature.....F. L. Sessions
Atomizer.....A. De Vibiss
Automobile.....A. S. Krotz
Automobile.....S. S. Conant
Bag holder.....A. D. Johnson
Bale compress. Round.....F. G. Dietrich
Baling press.....L. Trabue
Ball gathering device.....F. Minton
Bath tubs, &c. Waste fixture for.....F. T. Meyer
Battery plates for Plane type. Manufacture of secondary.....H. M. Martin
Battery separator. Storage.....H. Rodman
Battery tank. Storage.....H. Lesley
Bed bottom. Spring.....J. F. Brown
Bed. Hospital.....W. H. Fox
Bed lounge. Folding.....N. Levine
Bedstead fastening.....B. H. Jones
Beet culture implement.....A. S. Capper
Belt carrier.....J. Weichart
Berth. Ship's.....A. W. Hitt
Bicycle.....F. C. Moore
Bicycle attachment.....J. B. Davis
Bicycle lock.....H. W. Morgan
Bicycles. Combined mud guard, supplemental seat, and parcel holder for.....H. M. Lambert et al
Bicycles. Two speed driving gear for.....W. Goodbrand
Bin.....J. A. Jamieson
Binder alarm device.....H. E. Irwin
Binding envelop or file.....H. D. Winton
Boat. Sailing.....T. Jensen
Bobbin skewer.....R. Schofield
Boiler safety device. Steam.....F. Foskett
Book backing protector.....S. Litwin
Book. Balance.....J. R. McCord, Jr
Book. Coupon collection and receipt.....W. S. Cappeller et al
Book or pad. Manifolded memorandum.....E. Z. Lewis
Boring tool. Joist.....S. McClellan
Bottle cover. Temperature preserving.....F. T. Griffith
Bottle. Non-refillable.....T. P. Weible
Bottle. Non-refillable.....H. V. Buttner
Bottle. Non-refillable.....L. C. Wedgefuth
Bottle stopper.....A. Eklund
Box.....R. Jannuzzi
Brake mechanism.....G. W. Greenwood
Breach mechanism.....J. F. Meigs et al
Brick molding machine.....J. Mohs
Bricks for building purposes. Machine for laying.....2 pats.....J. H. Knight
Brush. Bottle washing.....R. Hoerning
Buggy bed stay.....W. B. Williamson
Bugs or other insects infecting dwellings, &c. Apparatus for destroying.....C. Matthey-Meier
Building block and wall.....G. F. Whittlesey
Building construction.....W. M. Riley
Buildings. Metal framework for.....E. Huber et al
Burglar alarm.....W. B. Thomas
Burner cap.....W. H. & R. W. Miller
Buttonhole moistener.....E. Puff
Cable hanger.....S. Du Perow

Cable mechanism for hauling loads up inclined surfaces.....W. J. Jackman
Camera.....H. W. Locke
Camera support.....J. R. Stephens
Can body forming machine.....J. G. Hodgson
Canning apparatus.....J. T. Garner
Canteen. Army.....T. Kearns et al
Car bolsters. Swinging spring seat for.....C. T. Westlake
Car brake.....F. O. Brown et al
Car brake mechanism.....G. E. Burgess
Car check lock. Mine.....L. J. Joder
Car construction.....H. C. Hodges et al
Car coupling.....H. H. Marshall
Car. Double deck.....W. E. Sharp
Car draft rigging.....W. G. Swan
Car draft rigging.....J. A. Hinson
Car. Dump.....E. M. Ray et al
Car feeder.....E. A. Boser
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Cart. Hand.....B. Butler
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Cement.....J. T. McK
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Cherries or other single stoned fruit. Machine for removing stones from.....W. P. Harris
Cigar box. Moisture proof.....A. Morten
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Circuit breaker. Automatic.....B. Ballantyne
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Claw bar.....W. W. Kettler et al
Clock. Calendar.....J. I. Peatfield
Clock. Electric alarm.....W. C. Bethel
Clock escapement. Electromagnetically controlled.....A. H. Grenfell
Clock. Self-winding electric.....C. M. Crook
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Clothes drier.....K. C. Moore
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Clutch. Friction.....R. E. Olds
Coat.....H. Wolf
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Cock. Angle.....J. A. Helm
Cock for multiple light gaseliers. By pass stop.....W. H. W. Fahndrich
Cock or faucet.....W. H. Douglas
Coffee pot.....M. H. Sexton
Coin alarm and registering apparatus.....A. Barrett
Coin holder.....A. Anderson
Compressor.....F. W. Parsons
Condenser. Induction.....L. Schutte
Conveyer.....R. S. Hill
Copper and nickel from sulfid compounds. Extracting.....C. Hoepfner
Cotton chopper and clod crusher.....M. E. Gooing
Cotton compressor.....F. L. White
Coupling device.....J. G. Kanouse
Cradle and baby jumper. Combined.....J. W. Blackledge
Crane. Lifting.....T. Kauffman
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Crupper dock forming machine.....C. H. Rudge
Cuff holder.....C. E. Hultquist
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 Molds. Forming sand S. J. Adams
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Dresser C. J. Clarke

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Garden implement.....E. M. Hartell
Garment supporter.....J. Wilkinson
Garment supporting button attachment. Separable.....H. F. Stowell
Garment. Union.....W. A. Graham
Gas burner safety attachment.....S. H. Blodgett
Gas burners. Automatic cut off for.....L. F. Ducker
Gas engine.....A. T. Brown
Gas furnace.....F. G. Hamer
Gas generator. Acetylene.....W. S. Hamm et al
Gas generator. Acetylene.....J. A. Mosher
Gas generator. Acetylene.....D. J. Van Praag
Gas igniting device. Electric.....J. A. Mosher
Gas service safety valve.....L. M. Osborne
Gas storage tank.....J. A. Mosher
Gate.....W. Fuller
Gearing.....W. L. Voss
Gearing. Frictional.....W. D. Dailey
Gearing. Speed changing friction.....O. Marth
Grain cleaner.....H. Sommerfeld
Grain drill seeding attachment.....H. G. Walton
Grain drill shoe.....W. F. Brown
Grease. Extracting.....D. Cameron
Grinding machine.....J. Ettinger
Grooving assembled stock. Machine for.....M. B. Tidey
Grooving tool. Rotary.....A. R. Meister
Gun cleaner.....D. G. Garrison
Gymnastic apparatus.....D. G. Mattsson
Hamper.....G. M. Davidson
Handkerchief holder.....N. E. P. Bergmann
Harvesting machine.....B. F. Rinker
Hat forming machine.....J. Marshall
Hay and stock rack.....C. Scafe
Heat distributing system.....W. H. Pearce
Heating apparatus.....J. K. Kloebe
Hoisting hook for ore buckets, &c. Safety.....H. B. Gray
Hook and eye.....L. A. Sutherland
Hoop making machine.....J. C. Perry
Horse shoe.....J. Rice
Hose coupling. Train pipe.....A. S. Cummins et al
Hose supporter.....M. H. Eisenman
Hot air heater.....M. B. Moore et al
Hot air register.....J. Buckman
Hub and brake for motor vehicles. Combined.....F. Le Flem
Hub attaching device.....A. H. Worrest
Hubs from tubular blanks. Machine for forming wheel.....E. Einfeldt
Hydrocarbon burner.....J. F. Higgins
Hydrocarbon vapor burner.....E. Le Pelletier
Ice making machines. Congealing body or plate for.....E. Barrath
Incandescent mantle support.....M. Herskovitz
Index. Card.....G. G. Hakes
Inhaler.....C. H. Myers
Ink well.....G. H. True
Inking apparatus.....L. B. Woodruff et al
Key ring.....J. R. Lomas
Knife.....X. E. Putney
Knitting machine.....D. A. Booker
Knitting machine. Circular spring needle.....F. Wilcomb
Lace making machine.....A. Matitsch
Ladder. Step.....V. B. St. John
Lamp. Electric arc.....2 pats. J. S. Nowotny
Lamp. Hydrocarbon incandescent.....P. B. Currau
Lamp. Signal.....T. McWatters
Last. Darning.....M. G. Tilney
Latch.....E. J. Root
Leather setting frame clamp.....J. T. Lykens
Lid or cover actuating device.....J. C. Lodor
Limb support.....M. H. Bigsby
Linotype machines. Aligning mechanism for.....A. G. Cotsworth
Lock.....A. B. Wallace
Lock and latch. Combined.....J. B. Cox
Locomotive forced draft appliance.....J. A. Eson
Log releasing device for scows.....E. W. Spencer
Magnet. Blow out.....W. B. Potter
Mail matter carrying apparatus.....G. S. Pothe
Match boxing machine.....C. F. Christ
Meat curing apparatus.....J. C. Lincoln
Mechanical movement.....A. Wahle
Medicine administering apparatus.....W. P. & E. H. King
Medicine bottle dropping attachment.....A. C. Bechtold
Milk can.....C. M. Hopkins et al
Milk pasteurizer and sterilizer.....C. E. Hinman
Mills. Bur for.....J. Jorgensen
Moistener and sealer. Envelop.....F. A. Jones
Molding machine. Sand.....J. R. Davies
Motion. Mechanical movement for converting.....J. F. Watts
Motor.....J. Ulrich
Movements and indicating the position of indicators or the like. System of and apparatus for transmitting.....W. A. Thiermann
Multipress. Double. reissue.....H. A. W. Wood
Music sheet turner.....C. E. Bertogliatti
Musical instrument strings. Tension apparatus for strung.....P. Pechenart
Nail machine.....E. Schwarz
Necktie fastener.....J. A. Clinton
Necktie fastener.....J. Weil
Nut lock.....J. McVey
Nut lock.....R. Minges et al
Oil burner.....J. W. Lewellen
Oil can.....J. A. Baerle
Oils. Purifying hydrocarbon.....J. W. Warren
Ordnance. Breech loading.....J. W. Stockett
Ore washer and separator.....J. M. Longan
Overseaming machine. Blind stitch.....B. W. Tucker
Package carrying device.....S. de Pless Pol
Paddle wheel.....J. J. Graham
Paint or varnish. Composition for removing.....F. Priestman
Painter's tool.....G. Henderson
Paper box blanks. Furniture for forming.....J. T. Crow et al
Paper machines. Apparatus for removing rolls of material from.....M. A. Craft
Pen. Fountain.....J. Bovill
Pencil sharpener.....F. A. Cortis
Pessary.....B. F. Overton
Pessary.....D. B. De Waltoff
Pipe molds. Profile tool for making.....F. Burgers
Pipe wrench.....W. H. Enderton
Pipe wrench.....J. T. Ford
Pipe wrench.....H. Pease
Placket fastener.....J. R. Smith
Planer bed. Adjustable.....G. S. Myrick
Plant protector.....E. C. H. Behrens
Planter. Corn.....3 pats. D. Eley
Plaster composition.....M. T. J. Ochs
Playing ball.....2 pats. E. Kempshall
Plow. Grading.....J. Sowders
Plow. Motor.....R. J. Gatling
Plumber's testing plug.....J. Flynn
Pneumatic apparatus. Joint for use in.....C. L. Davis
Poke. Animal.....C. N. Troien
Pole. Push.....H. Wheler
Primer tray. Cellular.....H. S. Burns et al
Printing. Blauket for use in.....J. E. Rhodes
Printing die.....W. A. Force
Printing machine.....J. White
Printing machine feeding mechanism.....J. White
Printing machine. Web.....G. F. Read
Printing press sheet aligner.....O. S. Bowman
Printing press tympan surface.....A. S. Allen
Printing presses, &c. Automatic protector for.....T. C. Dexter
Prism glass for skylights.....G. E. Androvette
Propeller fan and propeller for ships. Rotary.....S. C. Davidson
Propeller. Oscillating.....C. Hayes
Propeller shaft governor.....W. R. May
Pulley.....W. E. Penn
Pulp digesters. Valve for wood.....J. Joule
Pulverizer.....R. Creuzbauer
Pump.....P. H. Deis
Pump.....W. J. Hughes
Pump actuating mechanism.....B. Musser
Pump. Centrifugal.....E. G. Harris
Pump strainer.....J. Kartz
Puzzle or game apparatus.....E. Meyer
Race starting machine.....C. W. Crowley
Radiator.....E. Moritz et al
Rail joint.....G. L. Hall
Railway. Electric.....F. W. Hild et al
Railway. Electric.....W. Behrens et al
Railway rail joint.....G. A. Weber
Railway signal.....W. S. Bennett
Railway surface contact. Electric.....E. M. Hewlett
Railway switch.....A. G. Turcotte
Railway systems. Electromagnetic switch for surface contact electric.....W. B. Potter
Railway tie. Metallic.....S. A. Sharum
Railway track structure.....G. M. Ervin
Railway track structure.....J. H. Pilieger
Ratchet tool.....E. E. Brown et al
Refrigerating, heating, drying, impregnating, or otherwise treating goods. Apparatus for.....J. McRae
Refrigerator.....F. R. Beal
Relay. Supervisory.....W. Kalsing
Rendering apparatus.....D. Cameron
Rheostat.....J. A. Mosher
Road cleaner, elevator, and dirt cart. Combined.....M. Stobbs et al
Roof or structure. Glazed.....E. Van Noorden
Rotary engine.....C. O. Morley
Rotary engine.....C. G. Cassidy
Rotary motor.....C. J. Skowen
Rotary steam engine.....J. T. Hays et al
Ruler. Parallel.....J. Sternfeld
Sad iron. Self heating.....W. G. Burns
Salt making apparatus.....J. S. Clarke
Sandpapering machine.....J. A. Hallden
Sash fastener.....J. C. Lodor
Sash fastener.....W. H. Nelson
Sawmill dog.....D. L. Cole
Saw tooth wrench.....G. H. Shellabarger
Sawing crooked timber. Timber drag for.....P. M. Ovarstrom
Screw cutting machine.....D. Lake et al
Screw protector. Set.....T. F. Kelley
Sectional heater.....J. G. Langdon
Sewing machine attachment holder.....F. Jacob, Jr
Sewing machine attachment holder.....H. P. Steward
Sewing machine. Blind stitch.....C. A. Dearborn
Sewing machine. Book.....F. Kugler
Sewing machine. Buttonhole.....F. T. Leilich
Sewing machine feeding mechanism.....C. A. Dearborn
Sewing machine feeding mechanism. Shoe.....Z. T. French et al
Sewing machine rotary take up.....M. Hemleb
Sewing machine rotary take up.....P. Diehl et al
Sewing machine rotary take up device.....P. Diehl et al
Sewing machine ruffler.....P. Diehl
Sewing machine. Shoe.....Z. T. French et al
Sewing machine take up device.....P. Diehl
Sewing machine tuck creaser.....H. P. Steward
Sewing machines. Purling device for over-edge.....J. G. Greene
Shades and curtains. Roller bracket for window.....F. A. Giorgio
Shades. Device for spring actuated.....E. T. Burrows
Shaft coupling.....I. Lehman
Shears.....W. Richard
Sheet metal siding.....E. G. Charlebois
Ship construction.....R. T. Green
Shoe fastener.....A. T. Jordan
Sieve. Self cleaning.....A. C. Brantingham
Sign. Electric light.....M. Norden
Slat forming machine.....G. W. Packer
Slugging and nailing machine jack.....L. A. Casgrain
Smoothing iron.....J. Jones
Soap cutting and spreading machine.....T. Gaynor, Jr
Solar heater.....P. G. Hubert
Soot or ash pan.....T. K. Stanton
Sound recording and reproducing apparatus. Horn for.....G. Osten et al
Spark arresting and discharging device.....E. J. Smith
Spectacle or eyeglass case.....C. M. Wells
Speed device. Variable.....W. E. Crane
Speed gage.....H. S. Credlebaugh
Square. Separable.....C. L. F. & M. C. Hooker
Stacker. Pneumatic.....E. Huber et al
Stalk cutter.....M. D. Williams
Stamping presses, &c. Automatic feeding mechanism for.....G. P. Schmidt
Staple forming and driving machine.....G. W. Packer
Steam generator.....C. A. Kitts
Steel ingots for forging. Treatment of.....C. T. Dudley
Stitching machine. Bar.....F. T. Leilich
Stone facing. Artificial.....C. W. Stevens
Stovepipe.....B. A. Williamson
Straw carrier raddle.....M. Heineke
Sucker rod stub.....I. Rallston
Sulfoeyanids from coal gas. Making.....H. W. Smith et al
Suspenders.....J. W. Burgett
Swing.....J. Bany, Sr
Swinging gate.....S. Hamilton
Table server.....A. T. Hatch
Table spread and napkin holder. Combined.....C. M. Wales
Talking machines. Horn supporting arm for.....L. P. Valiquet
Talley sheet attachment for billing platens.....R. J. Fisher
Telegraph. Printing.....T. M. Foote
Telephone systems. Toll collecting and call recording device for.....(reissue) J. B. Gill
Telephone wires. Device for preventing humming of.....M. Grover
Telesig. Multiplex.....W. S. Burnett et al
Thermometer. Multiplex electric.....A. Zeleny
Thill coupling.....C. A. Smith
Tire heater.....J. Gogel
Tire. Rubber.....A. W. Grant
Tire. Solid rubber.....C. H. Wheeler et al
Tire. Vehicle.....J. Christy, Jr
Tire. Vehicle.....C. H. Wheeler et al
Tobacco leaf sorting machine.....E. A. Rollman
Tobacco pipe.....H. L. Austwick
Tongue switch.....G. M. Ervin
Tooth. Artificial.....J. J. Reynolds
Tooth. Artificial.....T. Steele
Tooth mount. Artificial.....H. D. Justi
Top spinning device.....F. W. Kranz
Toy horn.....F. J. Gustine
Trace chain slip link.....W. J. Cass
Track indicator.....S. A. Staegle
Train control system.....C. E. Barry
Train controlling apparatus.....J. D. Price et al
Transfer system.....E. W. McKenna
Traveling bag. Telescopic.....E. U. Phillips et al
Truck bolster.....H. R. Keithley
Truck. Car.....H. A. Dornier
Trumpet. Ear.....E. De Meulemeester
Truss. Hernal.....J. H. Sherman
Turbine wheel support. Steam.....J. A. Bomgren
Turbines. Apparatus for controlling the speed of steam.....G. O. M. Olsson
Tympan surface bed.....A. S. Allen
Type casting and setting machine.....G. A. Goodson
Type casting and setting machine.....J. C. & J. C. Fowler, Jr
Type casting. Metal pump for.....(reissue) F. Wicks
Typewriter cabinet.....J. E. Anderson
Type writing machine.....J. E. Neahr
Type writing machine.....W. W. Morrison
Type writing machine.....C. F. Laganke
Type writing machine accounting attachment.....O. L. Ingram
Type writing machine platen.....R. J. Fisher
Type writing machine work gage.....C. F. Laganke
Type writing machine work gage and clamp.....C. F. Laganke
Type writing machine work gage attachment.....H. J. Halle
Type writing machines. Carbon roll billing platen for.....R. J. Fisher et al
Type writing machines. Ribbon feeding mechanism for.....R. J. Fisher
Vaginal injector.....A. Anderson et al
Valve. Automatic.....C. W. Hall, Jr et al
Valve. Check or clack.....F. W. Leidecker
Valve. Engine.....E. U. Down
Valve gear.....R. T. Love
Valve gear. Engine.....O. Hove
Valve operating means.....C. G. Y. King
Valves, &c. Operating mechanism for gas-engine.....J. B. Fenner
Vamp snipper.....J. G. Grall
Vapor burner.....W. J. Smart
Vapor generation.....A. Scharffe
Vehicle brake.....J. Orteig
Vehicle. Motor.....C. T. B. Sangster
Vehicle wheel.....N. A. Newton
Vehicle wheel.....2 pats. C. H. Wheeler et al
Vehicles. Combined muffler and mud guard for motor.....R. M. Keating
Vehicles. Tubular pole or shaft for.....H. McLoughlin
Vending machine. Coin controlled.....D. K. Stone et al
Wagon brake.....C. A. Francis
Wall. Building.....A. De Man
Warmer.....F. J. Meier
Washboard.....W. B. Murphy
Washboard.....G. W. Newsom
Water closet bowl.....H. T. Bush
Water cooler.....G. W. Born
Water gage.....F. M. Ashley
Water gage safety device.....J. A. Mosher
Water heater.....J. Foster
Water heater. Combined solar and artificial heat.....F. Walker
Water. Removing oil from.....A. E. Krause
Water wheel.....J. E. Houtz
Weighing or packing machine feed apparatus.....W. H. Doble
Wheelbarrow.....W. A. House et al
Wheel scraper or cleaner.....W. C. Oastler
Whist tray. Duplicate.....R. B. Starkweather
Wind motor.....C. F. Bamford
Window.....P. Lalor
Window cleaning chair.....S. Rabinowitz
Window opener.....J. Horsfield
Window screen.....J. P. McKeever
Window ventilator.....J. A. Russell
Wine cooler.....J. E. Meyer
Wine press.....L. Perotti
Wire machine. Barbed.....W. Emery
Wire stretcher.....C. Lienhardt
Wire stretcher.....J. Stevenson
Wire twisting and reeling machine.....W. Emery
Wood cutting machine.....J. A. Crismore
Woven fabric.....W. T. Smith
Wrench handle.....E. H. Sears
Yarn drying apparatus.....G. Stone
Yoke. Neck.....E. D. Jury
Yoke. Neck.....F. A. Nason et al

DESIGNS.

- Badge. Metal.....E. R. Sargent
Badge or similar article.....J. L. Ewin
Pincushion. Pedestal.....L. A. Bartholomew

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- Adding machine.....J. L. Levin
Adjustable brace or support for movable structures.....J. G. Rossman
Air brake system.....W. G. MacLaughlin
Air cooling, drying, and purifying apparatus.....W. L. Moore
Air motor.....E. Glowacki
Air purifier.....H. v. Puckler
Ammonia separator.....V. Johnson
Annunciator. Electric.....W. R. Winter
Ash or garbage receptacle.....T. W. Hughes
Asphalt cooking drums. Scraper for.....J. P. Nelson
Automatic switch.....H. A. Poppenhusen
Automobile.....S. T. Davis, Jr
Awnings. Device for raising or lowering.....G. H. Egbers
Axle and axle box. Vehicle.....H. H. Porter
Axle. Vehicle.....J. A. McLaughlin
Axletree repair implement.....F. Richard
Barrel hook or handle.....G. N. Beeching
Bearing.....H. H. Porter
Bearing for engraving machines. Spindle.....C. R. Jay
Bearing. Spindle.....J. Kilburn
Bearing. Thrust.....A. E. Henderson
Beds or seats. Framework for spring.....W. A. Murray
Belt. Conveyor.....W. J. Selleck
Bicycle attachment.....F. Gooch
Blast or other furnace.....E. F. Coffin
Boiler furnace.....A. M. Rankin
Boilers. Soot cleaner for steam.....W. Eichelberger
Bolster roll.....J. E. Long
Bolt locking device.....D. Ferguson
Book. Bank deposit coupon.....P. Kuehn
Book cover.....C. Neundorffer et al
Book or parcel carrier or holder.....T. H. Shottenberg
Bottle washing machine.....M. P. Shea
Brake.....G. W. Stevens
Brake head. Adjustable.....G. P. Ritter
Brake shoe adjuster.....E. M. Herr
Broom.....H. Neilson
Brush. Bottle washing.....C. K. Volckering
Brush. Sprinkling scrub.....F. Pirrung
Buckle.....E. T. Specht
Buggy top raiser.....M. Brown
Bushings. Machine for trueing piston ring.....A. R. Davis
Buttonhole cutter.....L. F. Monck
Button. Separable.....H. R. Sieverkropp
Calculating machine.....C. Hamann
Calendar. Collection.....E. O. Peterson
Cam mechanism.....G. B. Petsche
Car brake.....J. R. Montague
Car fans and ventilators. Pneumatic motor for.....C. A. Evans
Car fender.....J. W. Wehmeyer
Car fender.....C. Giblin

Car fender or guard. Tramway.....J. Bauer
 Car fender. Street.....O. Osen
 Car lighting. Generating apparatus for.....
 Car roof.....A. F. Madden
 Car vestibules. Safety attachment for trolley.....A. W. Wilcox
 Carbonator.....G. A. Flesche et al
 Carbureter for explosive engines.....G. A. Graves
 Card. Educational.....J. Gibson
 Cartridge.....G. Muller
 Cash register.....W. H. Bell
 Cash register.....E. S. Smith et al
 Cast off.....E. T. Specht
 Casting ingots in continuous long lengths.
 Apparatus for.....J. O. E. Trotz
 Cellulose products. Manufacture of.....
 Chain belts. Machine for assembling links in
 making.....J. C. Howe
 Cigar machine.....H. A. Schneekloth
 Cigarette making machine. Individual.....
 Clasp or fastener.....F. J. Ludington
 Clock. Electric.....N. Crane
 Coating for brick or stone. Moisture proof.....
 W. A. Tucker
 Coke ovens or other kilns tight. Making the
 interior of.....R. Kuhn
 Coking coal. Continuous process of.....
 Collar turning and ironing machine.....J. Hemingway
 Combustion promoting and controlling device.
 E. Baumgartner
 Concrete or the like. Machine for mixing.....
 W. J. Judd
 Conduit clamp.....F. O. Wellington
 Conveyor. Portable.....W. L. McCabe
 Core oven.....T. L. Griffith
 Corn husker.....L. R. Loomis
 Cornish roll.....A. J. Gates
 Corset cover.....J. M. Van Orden
 Corset fastener.....J. Britnell
 Cotton chopper.....J. H. Forister
 Crushing and pulverizing mill.....J. F. Sanders
 Crutch. Adjustable.....W. F. Drew
 Current motor. Automatic.....J. Roeh
 Curtain stretcher.....W. A. Mayr
 Demijohn covering.....J. G. Bahr
 Deodorizing.....F. M. Pratt
 Designs. Transferring.....C. Kraut
 Disintegrator.....E. R. Sutcliffe
 Distillation. Retort for wood.....W. B. Chapman
 Door attachment. Grain.....C. T. Docter
 Door. Flexible.....J. S. Blake
 Door stop.....J. C. Winn
 Doweling machine.....W. J. Edwards et al
 Drawers supporter.....H. C. Smith
 Dredge. Clam or oyster.....W. A. Thompson
 Dredge. Sewer.....E. Chaquette
 Dredger cutter. Hydraulic.....R. A. Perry
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 Drum. Heating.....E. Graham
 Drying apparatus.....J. C. Fleming
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 Dust collector and sweeper. Pneumatic.....
 J. T. Hope
 Dyeing, &c., apparatus.....D. Mattei
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 Electric accumulator plates. Separator for.....
 R. Alexander Katz
 Electric battery.....E. R. Gill
 Electric circuit. Loaded.....J. C. Lee et al
 Electric heater.....W. S. Hadaway, Jr
 Electric signal.....A. J. Haycox
 Electricity supply purposes. Cable terminal
 box for.....G. Wilkinson
 Engine ignition regulator. Gas.....
 M. J. Sullivan
 Engines. Sparker for explosive.....G. A. Graves
 Exhaust apparatus.....J. Y. Smith
 Extension table.....H. C. Schneider
 Fastening device.....R. W. Grove
 Feed mechanism.....H. Marles
 Feed trough.....J. W. Barnes
 Fence lock.....W. B. MacLean
 Fertilizer distributor.....A. McWhorter
 Filter bed.....J. C. Wallace
 Filter. Water.....A. G. Noack
 Finger straightening case.....M. Gottschalk
 Fire escape.....R. Hammerly
 Fire escape.....M. Abrams
 Fire escape and water tower. Combined.....
 C. Schwarz et al
 Fire in oil tanks, &c. Apparatus for exting-
 uishing.....J. Hazledine
 Fire protecting shutter. Automatic.....T. Ohno
 Fish trap hook.....M. Greer
 Fishing reel.....A. B. Hendryx
 Floor mat. Flexible metal.....
 G. W. & H. McNeely
 Flue cleaner.....T. J. Hart
 Fluids. Dispersing.....W. J. Morton
 Flush. Trap.....J. E. Keyt
 Fly trap.....E. Potter
 Formaldehyde. Solidifying.....R. Groppler
 Forming and pressing machine.....W. H. Hayes
 Freezing. Protecting exposed filters or other
 confined liquid bodies from.....L. K. Davis
 Fruit drier.....C. J. Kurtz
 Fruit. Means applicable for use in transport-
 ing.....R. R. Blandy
 Furnace.....E. O. Rickard
 Furnace stoking mechanism.....W. McClave
 Furnaces. Valve for heating.....
 W. F. Shick et al
 Furniture, &c. Leg or standard for.....
 W. G. Davis
 Galvanic battery.....C. B. Schoenmehl
 Game board.....F. E. Morrill
 Gams board.....M. Schinkel
 Garbage receptacle and means for handling
 same.....J. Thiele
 Garment supporter and waist adjuster.....
 A. L. Matlack
 Garment. Union.....G. O. Cook
 Gas burner.....F. Harper
 Gas burner.....S. A. Politsky et al
 Gas burner. Incandescent.....A. Murinick
 Gas generating apparatus. Carbonic acid.....
 F. A. Feldkamp
 Gas generator. Acetylene.....A. & P. L. Davis
 Gas generator. Acetylene.....S. W. Ray
 Gas generator. Acetylene.....H. L. Bugg
 Gas producer.....J. A. Herrick
 Gas retorts. Means for charging.....E. Drory
 Gear for traction engines. Drive.....
 D. B. Arnold

Gearing. Compensating.....E. Huber
 Gearing. Frictional.....G. W. Stinebring
 Genealogical chain record.....P. W. Gee
 Glass articles. Apparatus for forming.....
 J. A. Arnold
 Glove. Boxing.....J. Gamble
 Glycerin refining apparatus.....H. B. Schmidt et al
 Glycosuria antidote and producing same.....
 F. Blum
 Gold and silver from their solutions. Apparatus
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 Gold, silver, or other ores. Cyanid process for
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 Golf ball.....E. Kempshall
 Grain, &c. Apparatus for drying.....M. Konig
 Gramophone turn or supporting plates. Driving
 mechanism for rotary.....T. Birnbaum
 Grinding and polishing machine.....
 C. Maldaner
 Gyroscope for obtaining artificial horizons.
 Colimator.....P. Ponthus et al
 Handles to tools. Coupling for connecting.....
 W. A. Suttle
 Harrow. Rotary wheel.....E. Brucker
 Harvester cutter. Corn.....A. N. Hadley
 Harvester. Sugar beet.....R. M. Fraser
 Heating system. Steam.....W. E. Roys
 Hitcher. Horse.....P. K. Young
 Hitching device. Safety.....L. H. Abbee
 Hoisting bucket carrier.....A. Wirsing
 Hoof pad. Yielding.....T. Ryan
 Hopple or pasture halter.....H. A. Bostwick
 Horizontal positions. Means for keeping moving
 objects in.....N. Ach
 Horseshoe. Cushioned.....P. J. Coates
 Hot air wall register.....J. H. Pugh
 Hot blast furnace.....E. T. Bradford
 Hydrocarbon burner.....M. W. Morgan
 Ice can.....F. D. Swaney
 Ice cream can.....R. Bauers
 Igniter.....A. H. Humphrey
 Impressions. Device for making.....
 D. L. Falardeau
 Ink pad box.....J. Quartz, Jr
 Insulating support for metallic circuits.....
 J. S. Allen
 Intermediate coupling.....W. C. Wilson
 Jar opener.....W. S. Marsh
 Journal bearing.....H. H. Hewitt
 Journal bearing.....G. N. Sceets
 Key connection.....J. T. Schlacks
 Knockdown box.....J. E. Neihysel
 Labeling machine.....J. J. Gaynor
 Lacing hook.....G. W. Chipley
 Lamp. Hydrocarbon.....W. Hawks
 Lamp. Incandescent gas.....F. M. Brooks
 Lamp. Signal.....F. K. Wright
 Lamps by electricity. Device for lighting.....
 S. M. Meyer
 Lampback. Producing.....D. J. Ogilvy
 Lantern.....A. T. Bishop
 Last.....A. G. Fitz
 Letter box. Street.....F. D. Osborn
 Lever. Shunting.....W. Taylor
 Linotype machines. Trimming mechanism
 for.....F. J. Wich
 Liquid defecating apparatus.....J. E. Hatton
 Liquid heating apparatus.....J. Fliegel
 Liquid separator.....S. C. Hauberg
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 Locomotive engine. Compound.....C. M. Muchnic
 Loom.....D. F. Conklin et al
 Loom shuttle.....H. Bardsley
 Loom shuttle checking mechanism.....
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 Loom shuttle checking mechanism.....
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 Magnetic core for inductance coils.....
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 Manure distributor.....J. Howell
 Match box.....J. B. Frederick
 Metal cleaning and preserving composition.....
 W. C. Oberwalder
 Metal cutting cutting.....C. McRorie et al
 Metal piercing machinery for making hollow
 bodies.....B. F. McTear
 Metals and alloys. Treating metallic oxides in
 the production of.....F. C. Weber
 Metals from their ores, &c., in electrically
 heated furnaces. Reduction of.....
 R. C. Contardo
 Metallic strap.....E. H. Vogel
 Metallic tie and rail fastener.....A. Scholer
 Metallic tie and rail joint.....J. F. Cleary
 Miner's tool. Combination.....M. Hardsocg
 Mold for hollow concrete articles.....
 W. W. Reeves
 Monkey wrench.....C. P. Whittenmore
 Motion transmitting device.....C. F. Stokes et al
 Motor.....R. L. Barnhart
 Musical instrument. Mechanical.....
 J. McTammany
 Needle. Tape.....M. E. Whittemore
 Nipple. Bottle.....P. Gauss
 Nozzle.....C. R. Harris
 Nut lock.....C. L. Dunham
 Nut lock.....G. W. Vandevender
 Nut lock.....H. Anderson
 Nut lock for rail joints.....C. W. Robinson
 Oil burner.....J. S. Chenhalls
 Oil fuel generator.....W. H. Dye
 Oil. Producing cotton seed.....C. O. Phillips
 Ordnance. Breech block and chamber for.....
 C. Holmstrom
 Ore bin.....G. H. Hulett
 Ores preparatory to smelting. Desulfurizing
 of sulfid.....A. D. Carmichael
 Oval cutting machine.....W. H. Forker
 Oven swab.....G. W. Treichel
 Pail. Milk.....S. Bruckmann
 Pail. Milk.....J. H. King
 Paint.....W. Lennard-foote
 Panel board. Electrical.....H. Krantz
 Panel, lining, ceiling, and floor for buildings,
 &c., and paving for streets. Wooden.....
 W. T. Crosse
 Paper drying machine.....A. G. Paul et al
 Paper making machines. Suction box for.....
 J. B. Lynch
 Parchment free from germs. Producing veget-
 etable.....A. Mackensen
 Paving. Manufacture of bituminous.....
 W. S. Wilkinson
 Paving mixture or composition. Asphaltic.....

W. S. Wilkinson et al
 Pen. Fountain.....R. C. Paine
 Pencil. Lead.....L. C. Benitz
 Pendulum. Conical.....F. M. Clark
 Phonogram reproducing apparatus.....
 W. F. Messer
 Photographic film and making same. Casein,
 O. Buss
 Pile driver.....J. H. Hopkins
 Pipe fabric. Producing figured.....O. Timme
 Pipe hanger.....C. W. Smart
 Pipe holder or clutch.....D. P. Upson
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 (Continued in September Number.)

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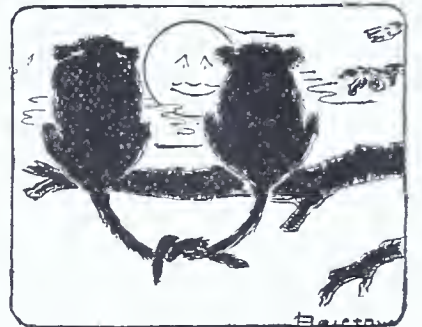
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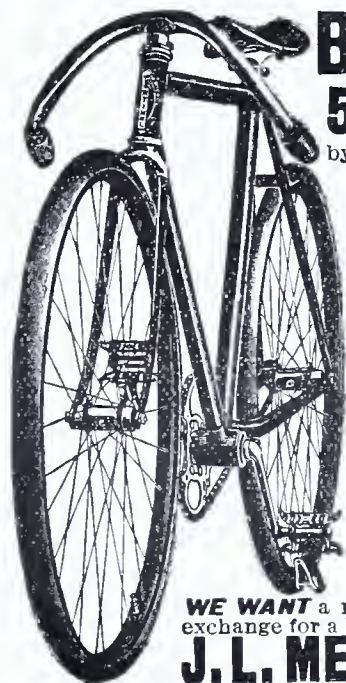
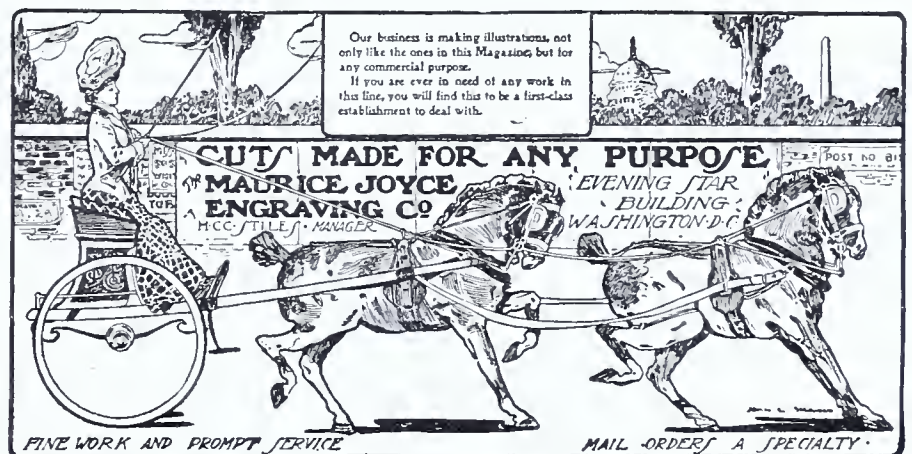
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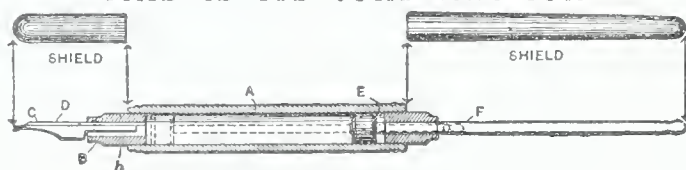


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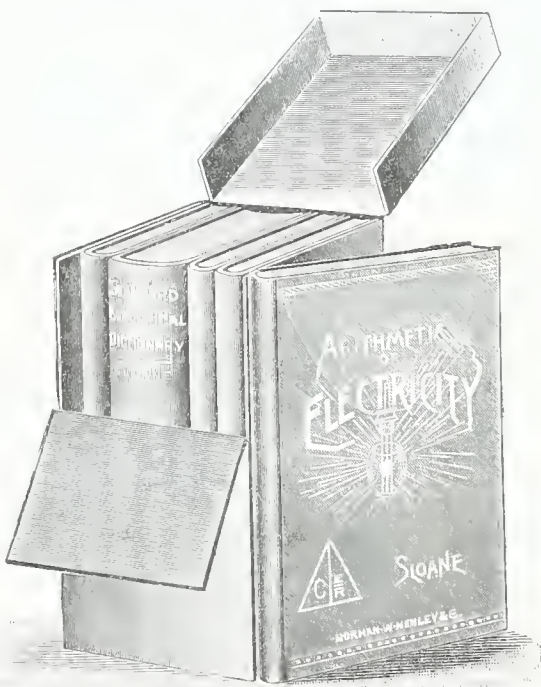
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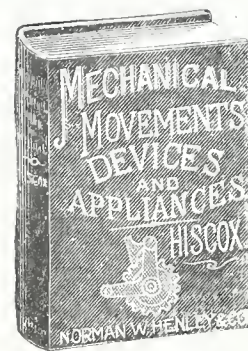
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AN AWARD FOR THE INVENTIVE AGE.

UNITED STATES COMMISSION TO THE PARIS EXPOSITION 1900.

Mr. E. G. SIGGERS, Washington, D. C.

New York, May 10, 1902.

Dear Sir:---I have the honor to send you under separate cover a diploma of award presented to you as a participant in the Collective Exhibit under Class 13 U. S. exhibit section at the Paris Exposition of 1900. Kindly acknowledge receipt, and oblige.

Yours respectfully,

B. D. WOODWARD, Ex-Asst. Commissioner General.

THE GRAND PRIX DIPLOMA, awarded at the Paris Universal Exposition of 1900, has been received by the proprietor of the INVENTIVE AGE, and we reproduce an engraving thereof in reduced size. It was a long time coming, but it seems that others have also had to wait.

As will be seen by the engraving, the diploma is a very artistic production. For the benefit of those of our readers who do not understand French, we will explain that the inscription states it was awarded in the exhibit of the journals and periodical publications of the United States. The group to the left represents labor and strength: the workman bending, with strained muscles, over his task, while his wife beside him holds their infant in her arms—a charming picture of toil in its relation to domestic peace. The figure of the woman is particularly well drawn. It will be noted that the strength and sturdiness of her frame, as befits the helpmate of the strong man at her side, do not interfere with, but even accentuate, a tenderness and grace that are distinctively feminine. The two figures to the right—the man with an ivy wreath, reading a scroll, and the sitting woman, absorbed in the study of a book, represent thought and the ideal. The group above the inscription—the man with tools, and the winged cherubs, one holding a scroll and another a torch, symbolize peace giving light to the arts, or facilitating their progress. In the upper left hand corner will be seen a shield, bear-

ing on a scroll the three words that, since the time of the Commune, have been inscribed on all French public buildings—Liberty, Equality, Fraternity. The entire design gives evidence of the artistic taste in which the French people excel.

In this connection, it may be of interest to note that Americans are winning prizes in new fields, in international exhibitions in Europe. Our tools, our machinery, our electrical apparatus, our shoes have long been known to be with-

out rivals; but the American invasion is beginning to be felt in less practical channels of endeavor. At a recent exhibition in Munich the American collection received more recognitions, in proportion to the number of pictures displayed, than any other section. One picture was bought for the New Pinakothek (the national gallery of modern art) by the Bavarian Government; two first-class and five second-class medals were awarded American artists, and several royal decorations were bestowed. When it is remembered that Munich is one of the centres, not only of German but of European art, having been richly endowed by the late King Ludwig, and that it is among the Meccas of students abroad, it will be seen that a record has been made for



American art. Nor is this the only instance. At an exhibit of decorative art, now in progress in Turin, Italy, the American section was the first to be completed, and the display is considered most creditable. It includes pottery, glasswork, tapestries, artistic leather, silverware, plaster work, drawings,

book covers, mosaics, gas and electric fixtures, engravings, photographs, Indian baskets, parquetry, etc. It has long been known that the Tiffany cut glass was not surpassed in any foreign product, and that our colored vases and other glass wares have gone into Bohemia itself, the home of beautiful creations in this line. 'Our photographs have an excellent reputation, not only in Europe, but in Japan and South America. At the exhibit of the German Photographers' Union at Duesseldorf, Germany, last year, American photographs made such a good impression that special terms were offered this year, in order to induce a more extended display. American manufacturers, it is said, have reached a more satisfactory solution of the problem of a practical combined hand-and-stand camera than their foreign competitors, and two lines of American sensitized paper are recognized as superior by advanced workers throughout the world. Our plates and films also are famous for their excellence, and our mounts—especially the platino mounts—excel in beauty and workmanship. Our magazines and newspapers are without peers in their general appearance, and especially is this true of the illustrations. Nowhere in the world can such reproductions of photographs, etc., be found. This is due not only to the engraving, but to the paper, and the methods of printing. The American pressman does surface printing with a light touch, using fluid ink and with ink fountain compartments thumbed loose or close, according to the depth of color wanted. The English printer insists on so heavy an impression that it is almost embossing, and the depth of color—very deep—must be the same clear across the page; nor will he use our hard, highly finished paper for newspapers, though for books, he wants a hard, solid, sheet iron kind of paper, which is so harsh that it destroys, after a couple of thousand impressions, the delicate lines of half-tone and other fine-line cuts. He rejects our mellow and soft but beautifully finished book paper, and wonders that he does not get as good results as we do. He thinks it is due to the engraving, and many London establishments have been fitted with our engraving machinery, and American engravers have been engaged, with the result that a decided improvement has been effected. Before our standard is reached, however, our mellow paper must be accepted.

American furniture, too, is coming to be recognized abroad for its lightness and grace. Altogether, it would seem that we will soon be free from the reproach that has for years been cast upon us, of having sacrificed everything to material success, and of being unable to create works of art. The territory of the United States is so extensive, and the conditions were so rude which the settlers had to face—conditions that still exist in some of the western states—that it is not strange that the development of the land should have absorbed all our energies and left us but little leisure for the graces of life. Now that we have time to turn our attention to lighter things, indications are not wanting that our art productions will compare well with those of older countries, and perhaps even, in virility and originality—witness the sculptured horses by Solon Borglum, which attracted so much attention at the Paris Exposition—will outrank our masters'.

The Prosecution of Applications For Patents.

By E. G. SIGGERS.

IT is surprising how many inventors have the notion that all an applicant has to do is to apply for a patent, and as soon as the application is reached in its turn by the Patent Office, it is immediately allowed or rejected. The idea that the rejection of an application can be overcome by an amendment or argument does not seem to enter their minds as a thing that is at all possible. Of course any one who has had experience before the Patent Office knows better than this, and understands that scarcely five per cent. of the applications filed are allowed on the first official action. Of the remaining ninety-five per cent, many of the applications have allowable subject matter, only requiring the skill of an attorney to put the claims in proper form, so as to avoid the references and reasons of rejection urged by the Patent Office.

Any one can file an application for patent in the Patent Office, but no unskilled person can properly prosecute it. It not only requires a thorough knowledge of the invention, but a complete understanding of over 200 Rules of Practice promulgated by the Patent Office, governing the prosecution of applications for patents before that bureau of the government, as well as a familiarity with the decisions of the Patent Office interpreting said rules, and the decisions of the courts on the question of patentability, etc. All this information cannot be gained by the prosecution of a few applications, neither can it be obtained from text books. Practice alone can sharpen the wit and add to the skill of the attorney. The greater the skill, the better will he represent the interests of his clients.

An application for patent consists of a petition, specification, oath, and in most cases drawings. A specification includes a description of what is shown in the drawings, a statement of the operation of the invention, its advantages, and a recital of the claim made for the particular parts of the invention, which are deemed by the inventor to constitute his improvement. A claim may be embraced in one or more clauses. We have known of numerous instances where a hundred or more claims have been granted by the Patent Office in a single patent. There is, however, no virtue in mere numbers, for the strength of the patent depends on the wording of the claims, whether they are few or many.

The Patent Office Examiner, when he reaches an application, reads the specification in connection with the drawing to understand what is the subject matter of the application, and then addresses his further consideration of the application to what is claimed. It is very often the case that an inventor has presented his claims too broad. That is to say, there are patents which anticipate the *terms* of the claims but not the substance of the invention. In such a case, an Examiner cites the patents to the applicant in an official letter, and rejects the claims on said

patents, and that rejection will stand, unless the examiner subsequently recedes from his position or an appellate tribunal overrules the rejection.

Let us suppose that an application is presented containing seven claims. The Primary Examiner in considering the application finds that the first, second and fifth claims are anticipated by prior patents. He writes a letter to the applicant informing him of the rejection, and cites the patents by number to the claims of the application. As all claims not rejected or objected to are considered allowed, this would leave, in the supposed case, claims 3, 4, 6 and 7 in a favorable condition. The unfaithful solicitor having no regard for the interests of the inventor, could cancel the first, second and fifth claims and obtain the immediate allowance of the application, and unfortunately, the inventor would be none the wiser, for as a rule, inventors know little or nothing about claims. But a proper consideration for the interests of the inventor demands that the rejected claims should be carefully considered, in connection with the reasons of rejection, before any action is taken on behalf of the inventor. Copies of the anticipating patents should be purchased and examined, and their relevancy to the rejected claims looked into. Possibly it will be found that the claims are anticipated in their broad terms. If so, there are two courses open to pursue: cancel the rejected claims, or amend them. To determine whether the claims should be canceled or amended, requires judgment of the highest sort. Too careful consideration of the case cannot be given at this stage. A mistake made at this time cannot be corrected.

Suppose, in the case under consideration, that the attorney should decide to cancel the first claim, amend the second claim, and request reconsideration of the fifth claim. He files what is known as an amendment and argument embodying these several actions on the claims under consideration. At this point, more time is consumed. The Primary Examiner will not take up the application at once on the filing of such a communication from the applicant, but the case will have to await its turn again as an "amended" case, say from three weeks to three months, depending wholly on the condition of work in that Division. When reached a second time, the Examiner may adopt the views of the applicant and allow the application, or he may think that the amendment made to the claims does not go far enough to distinguish the invention from the patents cited, or he may find additional patents on a second examination. Whatever action is taken, the Examiner will again express his views to the applicant in writing. This second action may be taken several weeks if not months after the amendment was filed. The attorney, on receipt of the

second official letter, takes up the case again, goes over the reasons of rejection, and answers the official letter either by an amendment of the claims, the cancellation of the claims, or a request for reconsideration. Very frequently at this stage, an interview with the Examiner is sought. This process of amendment and argument by the attorney, and reexamination by the Patent Office Examiner, may be kept up through months and even years, until an issue is finally reached between the Examiner and the attorney.

If the attorney, on receiving an official action in a case, finds that the references cited are not pertinent, and he has been unable to convince the Patent Office Examiner that the claims are allowable over the patents cited, he advises an appeal. The applicant has the right of an appeal to a higher tribunal of the Patent Office, after a second rejection of the claims on the same references and reasons has been given. Such appeals are quite often taken, and in a large percentage of cases they are successful. An appeal should always be filed where there is clear evidence that the Primary Examiner has not anticipated the claims presented and refuses to allow them. Three appeals are allowed. One to the Board of Examiners-in-Chief, at an expense of \$10; another to the Commissioner of Patents, at an expense of \$20; and a third to the Court of Appeals of the District of Columbia, which is very expensive, and is not often resorted to, as the Court very rarely overrules the decisions of the Patent Office.

It will be seen from what has been said, that it requires not only the skill of an able attorney to prosecute an application for patent, but that the attorney should have a conscientious regard for the inventor's interests and his own reputation. He should be imbued with a high conception of the duty that an attorney owes to his clients. He should not be willing to trust wholly to his assistants, the work which should have his personal supervision. Because of the fact that the number of rejections in an application for patent are almost limitless, and that the filing of each amendment and argument, and the making of each rejection, delays the allowance of a patent so much more each time an amendment is filed or a rejection is given, it will be seen that no one can determine in advance when an application will finally be granted. While the inventor can ascertain at the time of filing his application when it will be reached for the first official action, and when each successive official action will be taken, there is no way of determining at the outset, or any subsequent time, the exact date when the patent will be allowed, simply for the reason that no one can say when the rejections will cease.

In this connection, what was said by Ex-Commissioner of Patents, Duell, in an interview in 1900, is so pertinent that it seems proper to conclude this article by quoting his remarks:

"Ninety-five per cent. of applications for patents are returned to the attorneys to be amended, because they make too broad claims. This is proper, of course, because the value of a patent lies in its breadth, and it is an attorney's duty to his client to fight for this. If he does not, the patent may be of little value when granted. The shortest period in which a patent can be secured is seven weeks, and it can be done in that time only by the attorney for the claimant conceding practically all the objections of this Office."

THE UTILIZATION OF WASTES AND BY-PRODUCTS IN MANUFACTURES.

WITH SPECIAL REFERENCE TO THE DECADE OF 1890-1900.

By HENRY G. KITTREDGE, of the Census Bureau.

PART I.

NOTHING in the arts of manufacture is more indicative of economic efficiencies than the utilization of products that have been rejected as wastes or residues in the industrial processes. The acme of industrial economy is the profitable employment of every atom of material in whatever form it may be presented or however obtained. Every particle of an organic or inorganic substance has a useful part to play in contributing to human necessities or pleasures, and when it performs no function toward some useful end, or remains dormant, it shows that the ingenuity and enterprise of man have not reached their fullest development, or that the arts of the laboratory have not revealed all the secrets of nature. The refuse of to-day is a source of profit to-morrow; and this has been going on for years, and probably will be going on for years to come, notwithstanding that even now there is little that is thrown aside as absolutely useless except as it may be utilized in the economies of nature. New revelations and new uses are constantly being found for substances of all kinds, whether in their original forms, or in their changed forms due to outside agencies. The world's increment of wealth is largely dependent upon finding new and more economical uses for materials, however exalted or humble they may be in the industrial scale, and especially the elevation of the humble to a higher plane of appreciated usefulness. If a thing is unused for man's enjoyment, it is because it has not yet found its place of utility.

Charles Babbage in his "Economy of Machinery and Manufacture," London, fourth edition, 1835, page 11, paragraph 9, refers to the employment of waste products, such as the hoofs of horses and cattle, and other horny refuse, in the production of prussiate of potash, and also to the re-use of old iron and old tinware.

The consumption of soap and paper, the quantity of letters exchanged, the extension of public libraries and the use made of them, etc., are often taken as a measure of the actual degree of civilization of a nation. An extensive and refined use made of the waste materials of industry and housekeeping might be considered with equal right as a measure of the degree of industrial development and capability. It would also scarcely be possible to find in the processes of manufacture and in agriculture an instance which shows to the same extent the really creative force of science and the characteristic tendency of a nation to economize, as its endeavor to keep, like nature, entirely within the circle of reproduction.—*Archduke Regnier, president of the Imperial Commission, Vienna International Exhibition for 1873.*

A nation's industrial greatness and wealth in the world's competition are definitely related to the skilful application of waste or residual materials in the arts and manufactures. The pro-

fits of industry are contingent upon the extent of the successful employment as materials of the by-products or wastes of industry. Success is oftentimes dependent on the superior utilization of that which is lowly in the scale of materials, so that it shall perform the functions of that which is more costly in a manner to satisfy the purpose for which the manufactured product is intended. There is nothing without an economic value for some purpose, if not in the industry in which it first appears, in some other where it can be turned to a profitable account. But while prevention of waste is of the highest importance in any process of manufacture, prevention of by-products is not always in the line of economy, rather it may be in the line of inexcusable waste. The valuable character of by-products is exemplified in the coal-tar products, from which exquisite colors and perfumes are obtained that minister to the caprices and pleasures of man, as well as to his needs. Matter that is the most unattractive, the most base, or the most offensive in its properties oftentimes contains the elements of the greatest usefulness and beauty.

Probably no science has done so much as chemistry in revealing the hidden possibilities of the wastes and by-products in manufactures. This science has been the most fruitful agent in the conversion of the refuse of manufacturing operations into products of industrial value. "Her magic wand has only to touch the most noisome substances, and the most ethereal essences, the most heavenly hues, the most delicate flavors and odors instantly arise as if by magic." Chemistry is the intelligence department of industry.

Dr. Lyon Playfair said in one of his lectures:

Chemistry, like a prudent housewife, economizes every scrap. The clippings of the travelling tinker are mixed with the parings of horses' hoofs from the smithy or the cast-off woolen garments of the poorest inhabitants of a sister isle, and soon afterwards, in the form of dyes of the brightest blue, grace the dresses of courtly dames. The bones of dead animals yield the chief constituent of lucifer matches. The dregs of port wine, carefully rejected by the port-wine drinker in decanting his favorite beverage, are taken by him in the morning as Seidlitz powders to remove the effects of his debauch. The offal of the streets and the washings of coal gas reappear carefully preserved in the lady's smelling bottle, or are used by her to flavor blanc manges for her friends. This economy of the chemistry of art is only an imitation of what we observe in the chemistry of nature. Animals live and die; their dead bodies passing into putridity, escape into the atmosphere, whence plants again mold them into forms of organic life; and these plants, actually consisting of a past generation of ancestors, form our present food.

For nearly a century the world's main supply of soap depended on soda,

which was obtained as a product of the sulphuric-acid industry. Notwithstanding soap was known to the ancients, it was regarded even in the middle ages as a luxury, and when it was not readily obtained, the lack of cleanliness was concealed by fine clothes and by perfumes. The soda industry being brought to a standstill in France during the French Revolution, the national convention of that country appealed to the chemists to discover some method for making soda from common salt, which had been shown by Du Hamel, in 1736, to contain the same base as soda. About forty years thereafter, Scheele found that caustic soda could be obtained from salt by the action of lead oxide; but the production of soda by chemical processes was unimportant from an industrial standpoint until Le Blanc secured results that gave to the world one of its principal industries. His discovery was based upon the treatment of chloride of sodium with sulphuric acid, forming hydrochloric acid and sulphate of soda. The hydrochloric acid was regarded as a by-product of so little value that it was allowed to pass off into the air, to the great detriment of vegetation in the neighborhood. To remedy this evil the English Government took action against the soda works to compel them to condense the acid and keep it out of the way, and this led indirectly to the discovery that hydrochloric acid could be used as a valuable agent in the bleaching industry, which, however, was at that time far from having attained its present height of development. For use in this way it was found necessary to employ some agent to decompose hydrochloric acid, so that chlorine could be obtained from it, and the best agent was found to be the binoxide of manganese, which the acid dissolves, setting free a part of the original chlorine of the acid or of the salt and forming manganous chloride. Previous to about forty years ago this latter product was allowed to go to waste, and it was not until the demand for manganese oxide was so great and the price so high that a reclamation of the spent manganese was looked upon as desirable, that this was accomplished, adding greatly to the resources of the chlorine industry for bleaching.

The choicest perfumes that are placed upon the market are no doubt obtained from oils and ethers extracted from flowers; but there are many others which are artificially made, many out of bad-smelling elements. The fusel oil obtained in the distillation of spirits has an odor that is peculiarly disagreeable, yet it is used, after treatment with proper acids and oxidizing agents, in making the oil of apples and the oil of pears; and the oil of grapes, and the oil of cognac are little more than fusel oil diluted. Oil of pineapple is best made by the action of putrid cheese on sugar, or by distilling rancid butter with alcohol and sulphuric acid. One of the most popular perfumes has for one of its essential ingredients material which is obtained from the drainings of cow houses, though it may be obtained at a less cost from one of the products of gas tar, out of which is also obtained

the oil of bitter almonds, so largely consumed in the manufacture of perfumed soap and confectionery.

The refuse of cities throughout the civilized world is now generally collected and disposed of for sanitary reasons, though in many instances it is utilized to good advantage for industrial purposes. The collection of this refuse has been made only within a comparatively few years, but is now carried on systematically, being more or less self-supporting and advantageous from an industrial point of view. Formerly this refuse was simply accumulated and disposed of by burning, or casting into streams or onto waste land. Now, bones, glass, rags, iron, paper, and other articles are separately collected and sold. Old tin cans are used (1) for the recovery of solder, (2) for the recovery of the tin, and (3) for remelting in the manufacture of steel or iron. The waste heat from furnaces, into which the inflammable refuse is thrown, may be utilized for steam purposes in operating engines for electric lighting and power. The city of Glasgow, Scotland, obtains waste heat from such furnaces equivalent to nearly 9,000 horsepower per day of ten hours for power for manufacturing purposes.

The food wastes of New York City are disposed of by what is known as the Arnold utilization process, which is, briefly, steam digestion and a separation of the cooked product into greases and fertilizer fillers. The greases are all, or nearly all, shipped abroad and, it is believed, refined and separated into several grades, such as "glycerin, red oil, lard oil, and inferior grades." It is not known that refineries in this country are as yet able to handle what is known as garbage grease, as the secret of the trade seems to be held abroad. The solids after being dried and screened are sold to the various manufacturers of "complete fertilizers," and by them made up into grades which seem to be particularly adapted for use in the cotton belt.

The process of utilization employed in New York is as follows: The garbage is delivered on the scows located along the water front and towed to a place of final disposition, which is at an average distance of about 25 miles from the dumps. It is there unloaded and placed immediately in steam-tight digesters and treated by steam under pressure varying from 30 to 80 pounds for about eight hours, the vapors of cooking being condensed and not permitted to reach the outer air. The cooked matter is then discharged from the digester into receiving tanks, and from the receiving tanks goes to presses, where the grease, together with a greater part of the water, is separated from the solids. The remainder of the moisture is taken from the solids in either steam or hot-air dryers. The grease and water are run into tanks or traps, and after gravity separation the grease is skimmed off, partially cleansed, and barreled for shipment. The solids taken from the dryers are put through screens, where metals, bones, crockery, etc., are separated from the fertilizer filler proper. This filler is then cooled and bagged, and is then ready for shipment. The tailings from the screens go on the dumps. There is left then only the water which has been separated from the grease; this is evaporated to the consistency of a thick sirup, and as much of this sirup as can be so used is mixed with some of the solids before drying. This admixture with the evaporated "stick" produces a better grade of fertilizer filler than that which comes from the dryers without treatment.

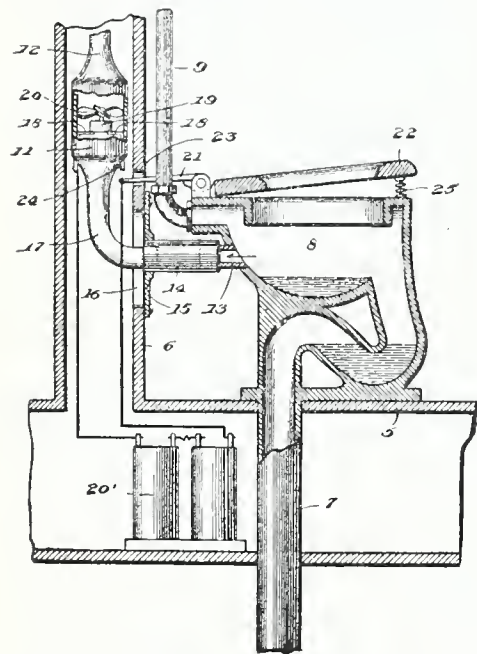
CLEVER NEW PATENTS.

Water-Closet Ventilator.—Shipping Package.—Crude Oil Burner.—Measuring Cup.

Water-Closet Ventilator.

A novel ventilator attachment for closets has been devised by Mr. Schayler C. Brown, of Saratoga Springs, N. Y. This invention relates particularly to that class designed to carry away the foul odors from water-closets, urinals, and other toilet conveniences, the object of the invention being to provide a construction and arrangement of parts wherein, when the closet or urinal is in use, the ventilator will be operated and when not in use the ventilator will not operate.

Referring to the cut, there is shown a construction wherein 5, represents a floor and 6 a hollow wall, and through the floor leads the drain-pipe from a water-closet, including a bowl 8, connected with the drain-pipe in the usual manner. Leading to the bowl 8, is the usual flush-pipe 9, through which water is introduced to the bowl to flush it, and connected with the rear of the bowl and below the point of connection of the flush-pipe, is a ventilating-pipe 10, which leads rearwardly and into the hollow wall 6, and in which it is bent upwardly and connects with a casing 11, the upper end of which is connected with the ventilating-stack 12. The ventilating-pipe includes the nipple 13, connected directly with the closet-bowl, and over the outer end of which is slipped a sleeve 14, which is engaged with a wall-plate 15, disposed to cover an opening 16 in the wall through which the ventilating apparatus may be inserted and removed, and in the inner end of the sleeve is engaged the end of the curved pipe-section 17, which is connected directly with the casing 11. Said casing is cylindrical, and disposed therein and resting upon brackets 18 is an electric motor 19, having a fan-wheel 20, disposed for rotation in a plane transverse of the casing, and having such shape that, when rotated, it will establish an upwardly-flowing current, so that air will be drawn from the closet-bowl and will be discharged into the ventilating stack, thus collecting all foul odors from the bowl and discharging them in such manner that none can escape into the room in which the closet is located.



It is desirable that the fan be operated only when the closet is in use, and for the purpose a circuit-closer for the circuit of the motor is provided and includes the seat of the closet. The batteries for energizing the motor are shown at 20, one terminal thereof being connected with a terminal of the motor, while the opposite terminal is connected with a finger 21, which is attached to the hinged closet-seat 22 and projects rearwardly through an opening 23 in the wall 6 into position beneath a contact-point 24, connected with the second

terminal of the fan-motor, so that when the closet-seat is depressed, as by a person sitting thereon, the finger is moved upwardly and into engagement with the contact-point to close the circuit of the battery through the motor to energize it. To hold the closet-seat normally in raised position, with the contact-finger out of circuit-closing position, a helical spring 25 is disposed between the under face of the forward portion of the seat and the upper edge of the closet-bowl. Thus when the closet-seat is occupied, the motor will be operated to effect a ventilation, and when the seat is unoccupied the mechanism will be at rest.

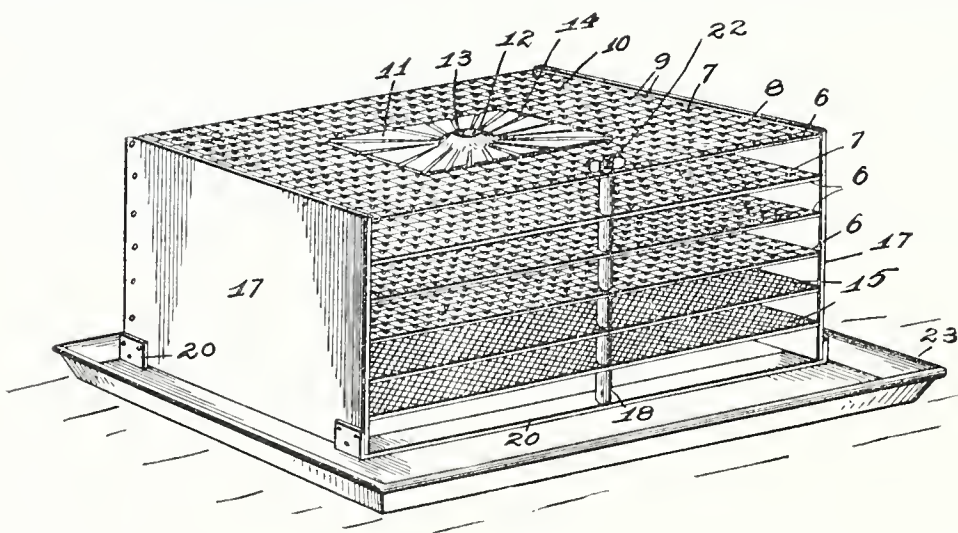
Shipping Package.

In shipping live lobsters from one city to another, it has been the common practice to pack them in barrels with a piece of ice in the center and broken ice on top, and in some instances with a cone-shaped piece of ice in the center of the barrel, with the lobsters packed around it, and broken ice on top. The difficulties met in both of these methods are many and the death rate is very high, the chief difficulty, and that which causes the greater per cent. of deaths during transportation, being the ice and water therefrom coming into direct contact with the lobsters. Then again, the weight of the ice on top of the lobsters is detrimental and hastens their death.

To overcome these objections, Mr. Frank W. Collins, a resident of Rockland, Maine, has invented a novel shipping package, one form of which is herewith illustrated.

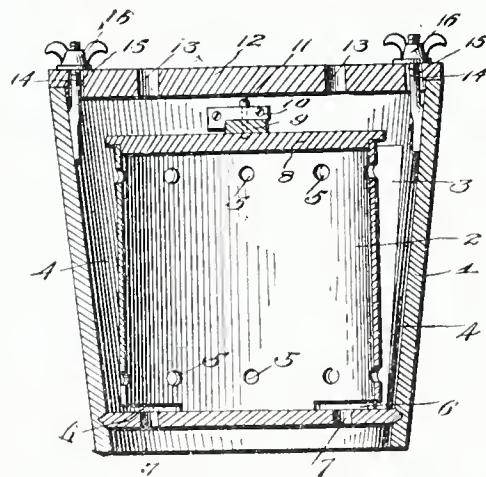
Crude Oil Burner.

Mr. Homer T. Wilson, of Fort Worth, Texas, a well-known inventor, has just obtained a patent on a crude oil burner, adapted for use in ordinary cook stoves, fire-places and the like. The improved burner consists of a series of superposed shelves 6, separated so that there will be considerable intervening air-space between each shelf. These shelves are preferably composed of sheet metal, with a line of transverse parallel corrugations 7, stamped or otherwise formed in them, and also provided with an additional longitudinal line



of similar corrugations 8, crossing said first-mentioned corrugations, and provided with a series of apertures 9, formed centrally in the highest projecting portions of said corrugations, whereby there will be a multitude of rectangular troughs or depressions 10, in the upper side of said shelves, in which the oil may be deposited and burned. A receiving and distributing pan 11, is preferably placed centrally upon the upper shelf and is provided with a central elevation 12, in which is a depression 13, and a series of troughs 14, is formed radially in said pan, and extend in all directions from

Figure 1, denotes the outer casing, and 2, the inner casing of the package, spaced apart by vertically-disposed cleats 3, thus forming ice-compartments 4, around the inner casing. The inner casing is provided near each end



with ventilating-apertures 5, and at its extreme lower edge with waterways 6, which allow the water from the ice to pass under the edge of the inner casing and discharge through the drain-orifices 7, formed in the bottom of the outer casing. Figure 8, denotes a covering for the inner casing, which is provided with a cross-bar 9, adapted to engage under lugs 10, secured at diametrically opposite points to the inner wall of the outer casing, pins 11, being inserted through perforations in said lugs and into the ends of the cross-bar, to prevent the cross-bar from turning out of engagement with said lugs. Figure 12, denotes the

the said elevation 12, to the edge of the pan.

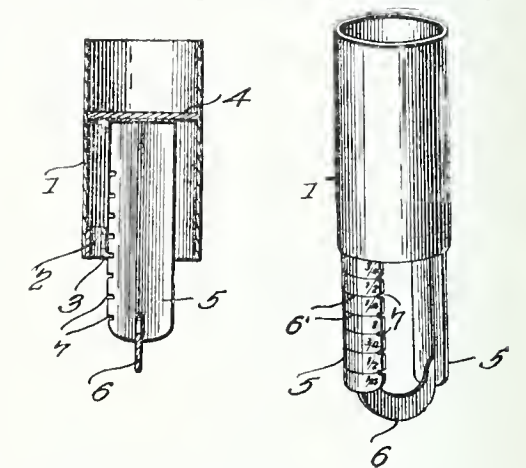
The burner is set in a drip-pan of a size sufficient to project a distance all around the burner, and this pan is filled with a supply of sand or similar material. The pan containing the burner is, when the latter is to be used in an ordinary cook stove, placed within the fire-box of the stove directly upon the usual grate shelves next adjacent to the front of the stove. Oil is supplied to the burner from a tank, which, of course, may be of any approval style and size and placed a suitable distance from the stove, so

cover for the outer casing, which is provided with one or more vent-apertures 13, and which may be removably secured in place in any suitable manner. The inner casing is packed with shell-fish, and the cover to the inner casing secured thereto. The ice-compartments are now packed with ice, and the space between the upper end of the outer casing, and the cover of the inner casing may also be packed with ice. As the ice melts, the water will run down and discharge through the drain-apertures in the bottom of the outer casing, and will not come in contact with the shell-fish. The vapors and cold air will freely circulate through the upper and lower apertures in the inner casing, and thus keep the shell-fish in a cool and moist condition.

Measuring Cup.

A simple though ingenious measuring cup for powdered or granular material has been patented by Mr. Joseph M. Strout, of Portland, Me. The accompanying cuts show a perspective and a sectional view through the same.

1 indicates a cylindrical cup or vessel open at both ends, and provided at its lower end with an inwardly projecting stop or shoulder 2, from one edge of which projects a small locking-tongue 3, the latter being arranged at the extreme lower edge of the cylinder. Within the cup or casing is a closely-

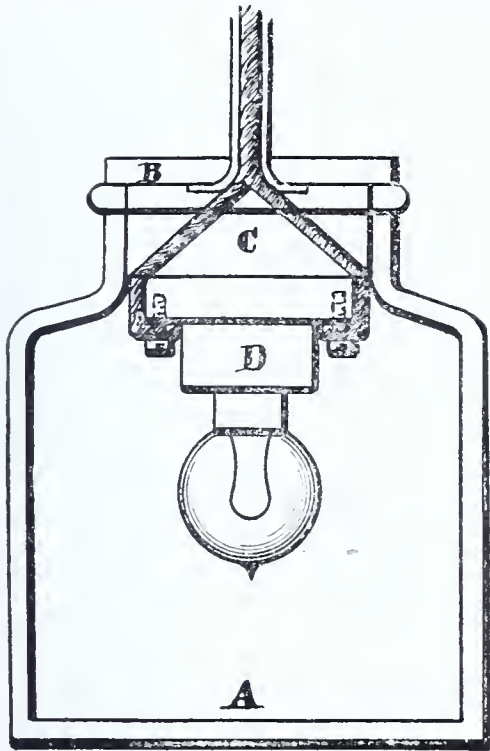


fitting disk 4, forming a false bottom or follower which may be adjusted to any desired position along the length of the cylinder to vary the cubic contents of the cylinder. The bottom or follower is secured to or formed integral with two slides 5, curved in cross-section to correspond to the curvature of the cylinder, and fitting snugly therein in order to create sufficient friction to hold the slides in any position to which they may be adjusted. The bottom of the slides are connected by a curved finger-piece 6, for convenience in adjusting the device, and as the slides and the cylinder are of equal length, the finger-piece will at all times be projected slightly below the lower end of the cylinder in convenient position to be grasped. In order to increase the friction between the slides and the inner wall of the cylinder, the slides may be formed of spring metal and slightly bowed or bent outwardly. On the outer face of one or both of the slides 5 is marked a suitable scale, as indicated at 6'. In the present instance, the cup or vessel is supposed to have a capacity equal to one tablespoonful or two teaspoonfuls, and the slide has been subdivided to form a scale representing fractional parts of the total capacity of the cup. To insure the retention of the false bottom or follower in its adjusted position, a series of notches 7 are formed in the vertical edge of one of the slides, a notch being placed at each of the division-marks, and said notches are adapted to be engaged with the tongue 3, by slightly rotating the slide and bottom by means of finger-piece 6. The stop or shoulder 2, forms the downward limit of movement of the bottom; but the latter, together with the slides and attached finger-piece, may be readily forced out through the top of the cylinder when the cup is to be cleaned.

FISHING BY ELECTRIC LIGHT.

An electric-light equipment that will add to the interest of an evening's fishing, as well as to the length of the resulting string of fish, is described below:

The necessary materials are: a small incandescent electric globe and porcelain base of about three-candle power, and three volts; a dry battery for same, of the kind used in bicycle or night lamps; several yards of two-



way flexible covered wire of small diameter; some rubber tubing to cover the flexible wire, a glass bottle with large mouth, and rubber cement.

The neck of the bottle should be large enough to easily admit the porcelain base. Cut a circular piece of wood B, from a cigar-box, large enough to cover the top of the bottle,

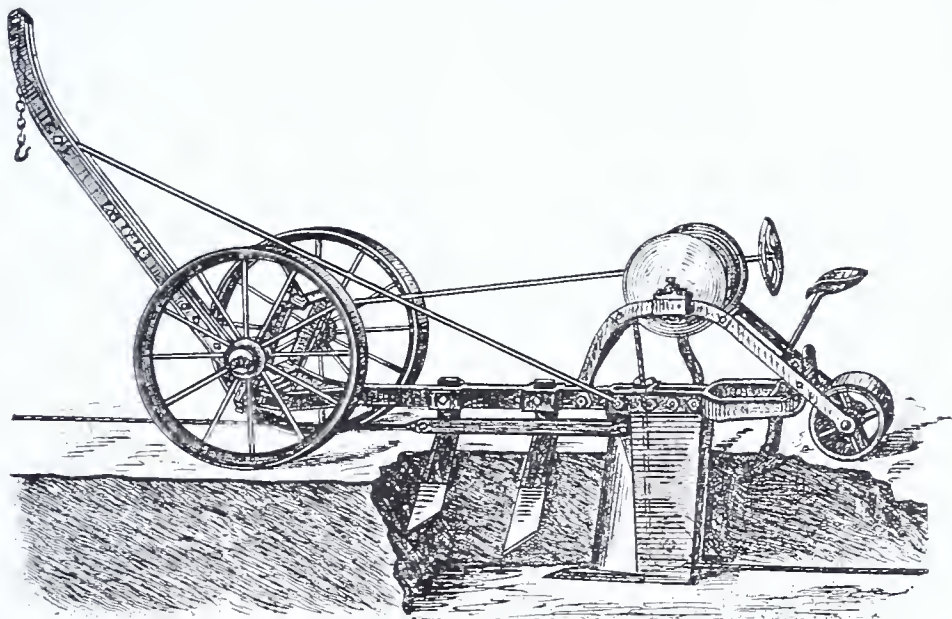
and in the center bore a hole to admit the rubber tubing with a tight fit. The porcelain base D, is screwed to the cork C, with two screws which should be long enough to reach into the wooden piece B. The flexible wire is then covered with the rubber tubing. An easy way to do this is to take a nail which will easily pass through the tubing, tie to it a strong thread, and from an upper window lower the nail into the tubing until it comes out at the other end. With the thread a string is then pulled through, and with the string the wire in the same way. Firmly attach the string to the wire without any large knots, and also see that the ends of the wire are not likely to catch on the tubing. The wire on the lamp-end should extend about three inches to allow for connections in the bottle.

Through the cork, bore two holes from the center of the top sides to the edges of the porcelain base. The wire and tubing are then put through the hole in the wooden piece B, the end of the tubing being attached with bicycle or other cement to the under-side of this piece. The two strands of the wire are then put through the holes in the cork and connected with the terminals of the lamp. The upper side of the cork is then covered with cement and pressed firmly against the piece B. When dry, the water will not reach the wire when the cork has been inserted in the bottle. The other ends of the wire are, when ready for use, connected to the battery, and the lamp will then light. The battery is kept in the boat. The wire not in the water does not require to be covered with tubing. In use, the bottle is weighted so that it will sink to the required depth. The battery is then connected to light the lamp. The light will attract many kinds of fish. The fisher and a properly baited line will do the rest.—*Amateur Work.*

A Cable Laying Plow.

In the *L'Industrie Electrique*, of Paris, there was recently illustrated a novel invention in the line of a cable laying plow for burying an armored cable to a depth of several feet below the surface of the ground without the necessity of digging a trench. The

row in the ground to the proper depth, and is followed by another coulter blade of somewhat wider shape, which in turn is followed by the hollow plow share. In the latter is a pulley from which the cable runs from the wire reel to the bottom of the trench. Following this is a coverer which turns the

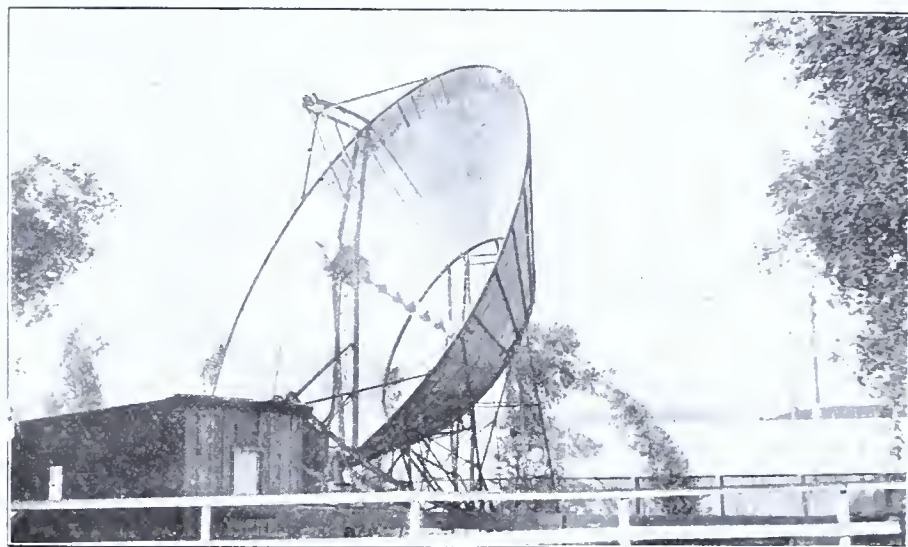


plow consists of a powerful subsoil machine of peculiar construction adapted to be driven by a cable attached to a winding engine or to be driven by a team of horses. The frame of the plow rests on three wheels and carries the cable to be laid. A coulter blade first opens a deep fur-

row in the ground to the proper depth, and is followed by another coulter blade of somewhat wider shape, which in turn is followed by the hollow plow share. In the latter is a pulley from which the cable runs from the wire reel to the bottom of the trench. Following this is a coverer which turns the

A SOLAR MACHINE.

From any point of view the Solar motor erected on the ostrich farm at South Pasadena, California, is of great interest. This means of utilizing the heat energy which comes from the sun is the outcome of many investigations and experiments in that line, and is only one of the various means that have long been experimented with to utilize the earth's natural forces. Tidal machinery is another one of these power-developing ideas. Properly utilized, this form of motor should serve to somewhat allay the fears of those who predict the exhaustion of the world's coal supply and the subsequent end of the world.



Through the courtesy of that always interesting journal *Shop Talk*, the AGE is able to produce an illustration of the motor.

The reflector is in the shape of a huge open umbrella, thirty-two feet in diameter. The parabolic reflecting surface, 640 square feet, is always automatically turned toward the sun by means of clock work, so that the rays are focussed in rings on the central tube or boiler, which takes the place of the stick in the umbrella. The boiler is a tubular one holding about 100 gallons of water. At a test,

192 pounds of water per hour was evaporated, forming steam of 150 pounds of pressure. The boiler is used to supply steam for pumping water, for irrigating purposes, and at this test the pumps delivered 1,400 gallons of water per minute against a head of twelve feet. The rings of light reflected from the 1,788 mirrors upon the boiler are plainly discernible. All day long, from half an hour after sunrise to half an hour before sunset, this automatic servant turns its face towards the bright California sun, and quenches the parched thirst of the dry soil with cooling streams of water.

Naturally, the efficiency of the motor is decreased in the absence of direct sunshine, but it generates steam nevertheless, and is located in a

country where the sun is to be depended upon. It is rated at about 15 horse power, and cost approximately \$2500.

It is thought probable that solar motors will sometimes be as common on all arid plains and scorched deserts as windmills are in Holland to-day. Under the desert sand there are often great water reservoirs which only need tapping to enable the desert to be converted into fertile pasture-land. In California and Arizona alone there are millions of acres awaiting such redemption.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Siggers, Patent Lawyer, Washington, D. C.

Stephen E. Burke, Edon, Ohio. Windmill.—The improvements in this class of motors resides in the means for lubricating the different parts, so that they will require little attention. An oil reservoir is located below the main shaft, and said shaft carries a disk movable through the oil. Scrapers are arranged upon the shaft bearings and engage the disk to scrape the oil therefrom and direct it to the bearings, from which it may again gravitate into the reservoir. Thus the shaft is automatically lubricated, and no lubricant is wasted. The other bearings are also provided with novel forms of lubricators, designed to hold quantities of lubricant and automatically feed it to said bearings. As a result, the windmill does not have to be oiled more than once a year, and it is operable by the lightest winds.

Charles W. Freeman, Mt. Carmel, Ill. Steam Engine.—In this engine there is no crank and pitman employed. The piston rod carries oppositely disposed racks which engage pinions mounted upon the driving shaft and connected thereto by oppositely working clutches. When the piston is moved in one direction, one of the pinions will be clutched to the shaft, while the other is free, and when moved in the opposite direction, the second one is clutched, while the first one is free. Thus, the shaft will be continuously rotated in one direction. The mechanism for operating the engine valve consists of a bar attached to the valve and operated by springs secured to the rack bars. The valve rod is locked at the opposite ends of its movements by tripping dogs that are operated by the springs. The mechanism, as a whole, is very simple, and there is no dead center to the engine.

John and John E. Bell, Eskridge, Kansas. Draft Equalizer.—The object of this invention is to provide mechanism of an exceedingly simple character, which will permit the use of an unequal number of draft animals on opposite sides of the tongue without creating any side draft, and can be adjusted so as to neutralize the side draft found in certain machines. There is a whiffletree lever pivoted between its ends to the tongue, and to one end of this lever is fastened a single tree. An evener lever is pivoted at one end in front of the singletree, to which it is attached by means of a cable secured to the whiffletree, and passing around pulleys fastened respectively to the lever and the vehicle. To one end of this cable is attached another singletree, while still another is fastened to the outer end of the evener lever. The several parts are made adjustable with relation to each other, so that all side draft may be compensated for.

Lawrence E. Troxler, Inventor; Chas. G. and O. H. Schaefer, Assignees, Louisville, Ky. Rotary Motor.—This motor is designed for use in connection with boiler tube cleaners and other similar implements. It comprises a cylinder having a concentric bore and an eccentric counterbore. In this cylinder is a rotatable piston having wings that are movable through the eccentric counterbore, the piston being attached to a shaft which projects from one end of the cylinder. The ends of the cylinder are closed by heads, in one of which is an exhaust port, while to the other is attached a supply pipe, a suitable passageway leading from this pipe through the walls of the cylinder to the bore thereof. The cutting mechanism is fastened

to the exposed end of the shaft in case the motor is to be employed as a tube cleaner, but it will be understood that the machine is capable of use for various other purposes.

Isaac N. Williams, Sullivan, Ind. Guard Attachment for Dental Engines.—The need of something to protect a patient's mouth from the grinding disks of a dental engine has long been realized both by the patient and the dentist, but it remained for this inventor to provide a device which is entirely practicable and operative. He employs a sleeve which can be attached to the hand piece and remain thereon. Upon the outer end of this sleeve is rotatably mounted a spring collar carrying an outstanding stem, to the outer end of which is attached a hood or cap piece. This hood is located directly over a portion of the disk, leaving the necessary amount of surface exposed, so that the work will not be interfered with. Thus, if the head piece should slip, there is very little danger of the grinding disk coming into contact with a person's gum or cheek and lacerating the same. Because of the spring collar, the hood may be rotated to any position desired to expose any portion of the disk.

George Kelly, Mineral Point, Wis. Composite Material.—The invention covered by Mr. Kelly's latest patent is another example of the vast usefulness, when turned to proper account, of what is ordinarily considered waste. Mr. Kelly has obtained a large number of patents for various materials of great use in the arts and manufactures, and composed wholly or in part of waste products. The patent just issued discloses a composite material having soft, spongy, elastic properties, and applicable for use in the manufacture of a vast variety of articles, for instance, mattresses, upholstered furniture and the like. The material is made up of an envelope or facing of fibre, as, for instance, cotton, tow, flax or the like, held in place with great tenacity by a filler of matted cockle burs. Burdock or cockle is a coarse biennial weed, heretofore considered valueless. Mr. Kelly has discovered, however, that this bur by reason of its peculiar tentacles is capable of being formed into a mat of great resistance, and peculiarly adapted for adhesion to the fibrous facing imposed upon it. The patent is not limited to these particular burs, but covers broadly a body of matted burs and closely packed fibre in adhesive union therewith.

John Zelly, Eaton, Ohio. Watch.—The patent recently issued to Mr. Zelly discloses a most ingenious improvement in watch construction. The object of the invention is to provide a watch movement with interchangeable cases and pendants, so that artisans or others engaged in more or less rough work may quickly replace the solid gold, or other high-grade case and pendant by a case and pendant of greater durability, constructed, for instance, of nickel or other comparatively cheap metal. By this means the farmer, laborer and mechanic may at all times enjoy the privilege of wearing an expensive watch movement, without subjecting the expensive case and pendant to the deleterious influences of perspiration and the grit which accumulates in the pockets.

Each of the cases designed for interchangeable use with the movement is equipped with a corresponding detachable pendant, and three separate catches all designed to be operated by the movement of the winding stem are provided. One of these catches locks the pendant to the movement; another locks the movement in the case, and the third locks the case cap. Slight movement of the stem releases the case catch, further movement thereof releases the movement catch so that the

movement may be removed from the case, and still further movement of the stem releases the pendant catch, so that the pendant may be removed from the movement. Having thus removed the high-grade case and pendant from the movement, the low-grade pendant and case designed for use during working hours are connected to the movement by means of the catches.

Randall T. Van Valkenburg, & C. J. Van Valkenburg, Inventors; William E. Crichton, Assignee; La Porte, Ind. Fire Extinguisher.—This device consists of a frangible body having a normally closed filling opening at the top and provided with a re-entrant bottom. One form of device is designed to contain a liquid fire extinguishing agent, and has an inwardly-directed bottom extension forming a chamber for an explosive cartridge, the fuse of the latter being embedded in an igniter which is packed in the re-entrant bottom. The igniter is composed of suitable material which will ignite at a temperature of about 160° Fahrenheit, thereby to ignite the fuse, explode the cartridge, break the vessel and scatter the fire-extinguishing agent over a considerable area. Should the fire-extinguishing agent be granular in form, the extension of the re-entrant bottom is dispensed with, the cartridge being within the receptacle with its fuse projected through an opening in the bottom. There is also a wooden bottom closing the re-entrant bottom, and a wire bail piercing the wooden bottom and twisted into a handle which bears against the closure.

Joseph L. Bangley, Inventor; Thos. J. Eley, Henry W. Campbell, James L. McLemore, Assignees, Suffolk, Va. Heating Stove.—This inventor has two patents, each of which is for an air-tight heating stove having an air-heating pipe piercing the top and bottom of the stove so as to take in cool air through the bottom of the pipe and discharge hot air through the top thereof, either directly into the same room or into other rooms. The stoves have been placed on the market and success is already assured.

The first of these patents covers the idea of an adjustable air-heating pipe, whereby the intake end may be adjusted towards and away from the stove so as to accommodate the device to the draft conditions surrounding the stove, and thereby to maintain the desired draft through the pipe.

The other stove has a perforate conical hood detachably fitted to the upper end of the heating pipe and having a hollow inverted conical deflector. Within the hood is a rotatable spiral flange which deflects the heated air outwardly through the perforations of the hood. There is also a tube which pierces the top of the stove with its lower end in communication with the interior thereof, for the escape of gases which accumulate within the stove. The upper end of the tube is normally closed by a pivotal perforate conical cap, from which rises a stem-like handle, with a conical gravity-plate mounted upon the stem to normally close the perforations of the cap, and yieldable under gas pressure to permit escape of the gas when increased beyond a normal pressure.

Benjamin B. McFadden, Binghamton, N. Y. Two patents.—Folding Paper Boxes. Mr. McFadden, the inventor, is the President of the Commercial Envelope Company, of Binghamton, N. Y., which has made a wonderful success in the manufacture of certain lines of envelopes and boxes. Both of the patented boxes are now being made and sold by the said company. The first invention consists of a box having its bottom, top, ends, and sides in one piece. The top is divided at an intermediate point, the sections being secured together by means of glue prior to the assemblage of the other parts of the box. In ad-

dition to glue as securing means, a fastening device is employed, one member of which is connected with the top, and the other member is formed on or attached to the ends of the box. The end parts have guard flaps integral therewith and reinforced by folding the outer edge over upon the body of the ends. The distinctive feature of this invention resides in the fact that the box blank is shipped to the purchaser in its flat or unfolded shape, with the top closed and the two ends open, and is capable of being folded into box form much quicker than any other box of its kind.

The second patent embodies two separate blank members, the main blank having a bottom section, a front section, a back section, and a cover section carried by the back section and provided with opposite flaps. The bottom and front sections are also provided with end flaps, of which the front flaps lie upon the outer sides of the bottom flaps. The other member embraces the rear edges of the up-standing bottom flaps, between the latter and the back section of the main member, and has its opposite ends folded across and secured to the flaps, the spaces between the bottom flaps and the front flaps forming pockets for the reception of the respective cover flaps. By this arrangement, the ends of the box are materially stiffened, and are also rendered dust proof, while the top and back swing away from the box along the line of fold between the bottom and the back, whereby the open top may be fully exposed without damaging the fold of the top or cover.

Alexander B. Kokernot, New Orleans, La. Two patents, Refrigerator Attachments for Barrels and Mechanism for Inserting the Attachments.—Mr. Kokernot has obtained several patents on refrigerator barrels, the broad idea of which consists in a tube that extends entirely through the barrel and is fastened in the heads thereof. In this tube is placed the refrigerant, ice being generally employed. The present invention is an improvement along this line. Bushings are screwed into the barrel heads and an open-ended tube is passed therethrough. The ends of the tube are then closed by suitable cap-plates, and the joints are made so that there is no danger of leakage.

The machine employed is of an exceedingly novel character. It comprises a hollow standard within which are pivoted a plurality of arms having outstanding fingers at their upper ends. These arms are operated by suitable mechanism preferably in the form of a crank lever, and the fingers are adapted to engage the ends of the refrigerator tubes. The upper end of the hollow standard is provided with a seat to receive the end of the tube which is held against turning. Thus, when one of said tubes is clamped in place, the barrel may be placed over it or removed from it without difficulty.

V. Baldwin Johnson, Washington, D. C. Chute.—Coal, when taken from the cars, is generally disposed of in two ways, either being delivered directly to customers or placed in stock for future delivery. In the first instance, it is immediately screened, while in the second it is not, for the reason that it soon slacks and upon its future delivery needs to be screened again. Mr. Johnson, who is one of the largest coal dealers in Washington, has invented a chute adapted to be placed directly upon a trestle and receive the coal from the cars. This chute is so arranged that the coal may be delivered to the wagons either in a screened or unscreened condition as may be desired, the worthless slack being collected so that it may be dumped into a wagon and removed. The structure is very simple and can be manufactured entirely of sheet metal. Its advantages will be evident to those skilled in this business.



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WASHINGTON, SEPTEMBER, 1902.

Making Patented Inventions for Personal Use.

Can a device or machine protected by a patent be made for the use of a person, and not for sale to another, without infringing the rights of the patentee? This question, if propounded to ninety-nine persons out of a hundred, would be answered in the affirmative. And this goes to show how unreliable is the advice which is handed out from the door stoop or the curbstone. How many persons have acted on such advice, and have felt the consequences, no one can say, but we have no doubt that many suits have been instituted against people who supposed that what they were doing was within their personal rights.

If one stopped to think and reason before answering the question, it would never been answered except in the right way. Suppose it were the fact that a person could make for his own use anything covered by a patent, where would the patentee reap his just reward? If everyone could make a single specimen of the patented thing for his own use, who would buy? What value would the patent possess for the owner? The simple fact is that the patent grant, by virtue of Section 4884 of the Revised Statutes, gives to the patentee "the exclusive right to make, use and vend the invention or discovery throughout the United States and Territories thereof." It gives the patentee more than the mere right to make, use and sell the patented thing, as the inventor had this right before the patent issued, and would have had such a right without applying for and obtaining a patent. The peculiar virtue of the patent privilege resides in (a) the "exclusive" right to make, (b) the "exclusive" right to use, and (c) the "exclusive" right to sell the patented invention. By granting to the inventor the "exclusive" right to make, use and sell the invention, it follows that anyone who does one of these things is an infringer of

the patent monopoly. Three separate suits may, therefore, be maintained: one against the manufacturer for *making* the patented article; another against the jobber or retail merchant for *selling* it, and still another against the customer who makes *use* of the patented device. Even the U. S. Government cannot appropriate a patented invention without becoming an infringer. This was decided by the Supreme Court of the U. S. in the leading case of *James vs. Campbell*.

The Value of Trade Mark Registration.

While there is no doubt that the trade mark laws are defective and need amendment, as shown by the action of the Commission, which was appointed to revise the patent and trade mark laws, in recommending extensive changes in the Statutes regulating the registration of trade marks, yet, imperfect as they are, the protection to a manufacturer by virtue of the present laws, is much greater than under the common law. It is not generally known that a manufacturer in this country has a right to enjoy the exclusive use of his marks, employed in trade and commerce, independent of any statute. The common law gives him that right. But because of certain defects in the common law, Federal registration laws were made necessary. At the same time, the rights which are obtained under the common law are not given up by registration in the United States Patent Office, for section 10 of the Act of March 3, 1881 says:—"That nothing in this act shall prevent, lessen, impeach or avoid any remedy at law or in equity which any party aggrieved by any wrongful use of any trade mark might have had, if the provisions of this act had not been passed." This means that a proprietor of any trade mark does not impair any common law right by registration. He retains all that he had, waives nothing and gains additional remedies. In a suit, he may combine claims of infringement antecedent to registering, with those that occurred subsequently thereto.

The advantages of Federal registration are many and may be summed up as follows: 1. It creates testimony, as registration is *prima facie* evidence of ownership in the trade mark. Not only the certified statement, or specification, and the declaration, fix the title in the registrant as against any other claimant, thereby throwing the burden of proof on the adverse claimant, if such there be; but the certificate is evidence in any suit or action in which it is brought in controversy, and establishes the precise description of the symbol claimed, defines the class of merchandise to which the trade mark is applied and affixed, fixes the date of adoption, and as to all the facts alleged, obviates what would otherwise be a necessity, *i. e.* the production of oral testimony, and that at perhaps great inconvenience and expense. 2. Registration is a compliance with the requirements of foreign nations, prior registration here being a condition precedent to registration in such countries by a citizen or resident of this country. Here it must be remembered that in

most foreign nations, judicial redress for infringement of trade marks cannot be had without registration. 3. It tends to uniformity of practice in suits of equity, and even in actions at law, notwithstanding that, when practicable, these are governed by the law of the state where pending. 4. The fact of registration gives cognizance to courts of the United States in controversies between citizens of the same state, where a trade mark used in foreign commerce is involved. 5. By registration, original and appellate jurisdiction is given to said courts without regard to the amount in controversy. 6. It gives a right to damages sustained in consequence of false representations made by a rival registrant. 7. The knowledge that a trade mark has been registered has a strong moral effect in deterring infringements. 8. The assertion of title on the national records gives an air of permanency to a trade mark, and being on such records, the title may be traced through all assignments. 9. Finally, registration is an indisputable prerequisite to a criminal prosecution for counterfeiting, or the selling of goods falsely marked, under the penal statute of August 14, 1876.

This statute prescribes that upon conviction, the penalty may be fixed at a fine of not exceeding one thousand dollars, or imprisonment for not more than two years, or both. If there was a similar penalty attached to the conviction of the charge of infringement of a patent, there would be less complaints against the patent system. In several European countries, the infringement of a patent is made a penal offense. The issuance of a patent should carry with it the strong arm of the government to defend its validity. It might mean less patents issued on small improvements, but this would not be a serious matter to the country at large.

One of an Attorney's Burdens.

One of the most difficult things to explain to inventors is the delay in obtaining the allowance of their application for patents. Many inventors have the idea that by paying some official in the Patent Office a fee, applications will be taken up at once and the patents obtained. Others think that a Congressman's or a Senator's influence should cause patents to be granted, whether the inventions are meritorious or not, and hence they enlist the assistance of their member of Congress in their behalf. Most of them, however, are aware that applications are taken up in their turn, but few have the slightest conception of the course of prosecution of applications. Therefore, the article in another column detailing the proceedings before the Patent Office, should be read by every one who has had, or is likely to have, any business before the Patent Office. It will save their attorneys many valuable hours in explaining trifling details connected with the business. No class of attorneys work harder for a smaller fee than the attorneys practicing before the Patent Office. This should not be so. But no small part of their time is taken up in correspondence about matters which the inventor should not require the attorney to explain. Not that there should be a cloak of secrecy thrown about the case, for that might be prejudicial to the interests of all parties concerned,

but what we think is that there is no more reason why a patent attorney should explain to his clients the whys and wherefores of his work, than there is for any other attorney to educate his clients in the intricacies of the law. The inventor should select his attorney with care, and when assured that he is a good one, give him free rein in the prosecution of the application. Every self-respecting attorney takes pride in the patents he obtains and is jealous of his standing before the Patent Office, and no attorney of that class has to be prompted to do his full duty by his clients. The other class?—Yes, there is another class, and they require all the watching that an inventor can possibly give to them. Fortunately for the inventor, the exercise of some caution on his part will enable him to steer clear of the second class of attorneys.

Compressed Air for Mine Haulage.

During the last ten years a great many mines have replaced animal haulage with compressed air motors, which lend themselves splendidly to the work desired. There are, in general, two systems, the low pressure system, in which air is compressed to five or six hundred pounds; and the high pressure system, with air pressure of 2000 pounds and over. The former system can be used in large galleries or tunnels or drifts where the width is ample and the track is reasonably straight. This permits a large receiver on the motor, 30 to 40 inches in diameter and from 8 to 16 feet long, to be handled with ease. The high pressure system is used where the drifts are narrow or the curves on a small radius, permitting only a small wheel base on the motor. Large receivers are, therefore, impractical, and steel tubes must be used and charged with high pressure air to get sufficient volume.

Compressed air may be used cold on either of these motors, or the air may be passed to small tanks of hot water supplied to the motor at the charging stations.

The air and hot water combination does almost double the work that cold air will do. These motors can carry sufficient air for any ordinary run desired and haul tremendous loads. Two miles and return, with fifteen or twenty loaded cars, is not an extraordinary effort, and from the general results obtained, the cost of haulage is from one-half to one-third of the cost of the animal power. The air escaping from the exhaust of the motor engines adds to the ventilating effect in the mine, and the whole system harmonizes thoroughly with the power outfit in the average mine.—*Cassier's Magazine*.

Perhaps the most remarkable scientific discovery made in a long time—so far at least as its wonderful possibilities are concerned—is that of radium. Apparently this substance has from the beginning been giving off particles at the rate of sixty to ninety thousand miles per second, without diminution of its own force—and will continue to do so forever. It supplies light without heat. A ray of this light conducts electricity. It converts oxygen into ozone and colors glass permanently brown. These are only a few of the properties of this remarkable substance. In the *Cosmopolitan* for September a brief article is published under the title "A New Field For Speculation," and announcement is made of a prize of three hundred dollars for the best paper on this subject.

SCIENTIFIC

PROGRESS.

Maximite.

Maximite, the new high explosive which has been adopted by the United States Government, is about fifty per cent more powerful than dynamite, and much more powerful than pure nitroglycerin. It is equaled in violence, among high explosives known to the commercial world, only by nitrogelatin and pure picric acid; and yet Maximite is so insensitive that it cannot be exploded by flame, or by piercing it with a white hot iron. Even molten iron has been poured upon a mass of it without occasioning an explosion. When heated in an open vessel, its temperature cannot be raised to the explosion point, for it will first melt, and then evaporate like water until nothing is left. In order to explode it, it must be confined very strongly, the same as when employed as a bursting charge for projectiles; and then to be set off it requires a powerful detonator. This quality of insensitiveness, coupled with its high explosive power, adapts maximite for use in armor piercing projectiles better than any other explosive.

A New Oxygen Producing Process.

There has been invented by M. Joubert, a French chemist, a new method of producing oxygen. The gas is generated simply by pouring water on a new chemical compound devised by him. It is claimed that the new substance can be produced cheaply, and that in future, the physician or chemist can have fresh and pure oxygen as he wants it, instead of purchasing it compressed to a dangerous degree in heavy cylinders.

The inventor proceeds on the well-known theory that certain metals, like sodium, potassium, and their alloys possess the property when heated in a current of air, of fixing the oxygen of the latter without combining with the nitrogen. Oxids of very different properties are thus obtained: some dissolve in cold water without any other phenomenon than that of simple hydration; others, particularly the higher oxids, are decomposed by cold water with a violent disengagement of pure oxygen. These bodies the inventor has named 'oxyliths' (oxygen stones) and for their manufacture the Electrochemical Company has recently installed a factory of 5,000 horse-power.

The oxylith is a substance resembling calcium carbide (such as is used for the generation of acetylene); it comes in small pieces, but the color is white. When water is poured on a lump of it, it immediately gives off oxygen; but if we stop pouring the water, the oxygen ceases to be given off, so there is no overproduction.

Waterproofing Blueprints.

Those who have experienced the annoyance of having blueprints discolored and blurred by rain, drippings in mines, and moisture in general, will appreciate a simple and cheap method of rendering the prints impervious to water. The waterproofing medium is

refined paraffin, and is applied as follows: A number of pieces of absorbent cloth, about a foot square, are dipped in melted paraffin until thoroughly saturated; when withdrawn and cooled, they are ready for use. One of the saturated cloths is spread on a smooth surface, the dry print is placed on it, and a second waxed cloth on top. The whole is then ironed with a moderately hot flat-iron. The paper immediately absorbs the paraffin, and becomes translucent and waterproof. The lines of the print are intensified by the process, and there is no shrinking or distortion. As the wax is withdrawn from the cloths, more can be added by melting small pieces directly under the hot iron. By immersing the print in a bath of melted paraffin, the process is hastened, but the ironing is necessary to remove the surplus wax from the surface, unless the paper is to be directly exposed to the weather and not to be handled.

Utilization of Waste Products.

A remarkable feature of the industrial development of the last century is seen in the multiplication of devices whereby waste may be diminished and by-products utilized. Every one of Nature's commodities is being turned to the best account, and scientists are no longer willing to regard any substance as useless refuse. Sawdust, which seems to the uninitiated to be quite valueless, is employed in many ways. Subjected to various manufacturing processes, it yields oxalic acid, tar, charcoal and even gas; it is used in fur dressing and scent making; it is employed for manufacturing floor cloth and linoleum, heavy stamped or embossed material to take the place of wall paper, coarse wrapping paper and millboard. It is also employed, to a slight extent, in the manufacture of gunpowder and other explosives. In the shape of bricks, it is used as fuel in Prussia, and it is said to be an ideal heating substance, being clean and having no tarry ingredients to generate smoke. In a planing mill in North Carolina, no fuel is used save sawdust, which is dampened and then thrown into the furnace. It is also employed in other parts of the country (mixed with melted rosin and pressed into squares) for making fire lighters. The dust of fine wood, mingled with blood, is pressed into molds and sold as imitation ebony. Most remarkable, however, is its application as food for cattle. This brings to mind at once the tale of the farmer who applied green goggles to his horse and fed him on sawdust, with the well known result; but in the modern instance, the sawdust is mixed with beet residue, which is also used alone, (as well as mixed with peat) for animal food. It is asserted that an analysis of certain kinds of wood shows that it contains more nutritious matter than straw, which is fed to cattle in Europe, in mixtures, in considerable quantities. The sawdust of this wood, together with the sugary matter contained in the beet residue, is said to provide a cheap and easily digested food.

Nails are made from the waste

scraps of tin plates: coal dust is formed into briquettes, which are used for fuel. The glassmaker relies on several by-products of gas, soap and alkali works, and also employs the feldspar laden slag of iron works. In lead smelting, the smoke from the works is made to pass through a series of specially constructed flues, where part of the lead, which would otherwise be wasted, is recovered.

In the manufacture of coal gas, the cost of the product is diminished by the recovery of the valuable by-products, such as tar and ammonia. When cobalt was separated in the form of an oxide from nickel many years ago, it was at first considered a waste product, but the potters discovered that it yielded a color of great utility for the decoration of their wares, and they are glad to pay well for it.

The gas-carbon formed in the retorts of gasworks was considered mere refuse, until it was found that it was a most suitable material for anodes in the electrolytic cell, and it is now sold at a price of about \$15 a ton for that purpose. Town refuse, also, is a valuable asset in conjunction with the destructor and power plant. Not a few cities are lighted by the electric power generated from the refuse of the district. Perhaps the most striking instance of the utilization of waste matter, however, is found in the oil industry. Until quite recently, only the finer petroleum was thought to be of any use, and some two-thirds of the total production was thrown away. It has now been proved that this residue forms the finest fuel, and contains immense heating power. Among the advantages claimed for it is the lesser space and more convenient form of storage on board ship or locomotive. Many vessels are now being propelled by mineral oil, and several of the great railway companies are using it, though as yet, mainly in an experimental way. The United States Navy has been so pleased with recent trials that it is arranging to make at least some of our war vessels, in the future, independent of coal stations. Oil stoves are also gaining in popularity, and compressed into the form of briquettes, petroleum is being used in many industries.

Electricity for Cultivation of Plants.

From Frankfort, Germany, comes a report concerning experiments made by Mr. J. Fuchs, a wine producer of Elba, in the use of electricity in the culture of grapes. Some years ago he planted four fields with native grape vines, in the midst of a district infested with phylloxera, and treated two of these fields with electricity. On a field of about one-half acres, five masts were erected, the tops of which were arranged with means for collecting and accumulating electricity from the atmosphere. These accumulators were connected with each other by wires. Wires were also laid in the soil about one and one-half feet deep, forming an evenly distributed metallic net. Every accumulator was connected with this metallic net by a wire running along the mast. Short wires connected with the plants, the free ends

being stuck into the stem or into the main root thereof. The difference in the development of the grapes of the fields was apparent. Those treated with electricity gave better results both in quality and quantity, and were not infected with phylloxera, while the other fields were.

Mr. Fuchs thinks that the experiment has demonstrated that electricity increases the efficiency of the earth. He found that it was not sufficient to simply conduct electricity to the earth, but that there should be direct metallic connection of the electric circuit with the main stem of the plant.

The importance of this invention is manifest. The same scheme can be carried out in orchards, thus clearing the same of many of the bugs and worms which are now such a serious prey on various fruit-bearing trees. The invention is one that will bear close consideration, and the AGE will make an effort to secure further details.

A New Source of Rubber Production.

With rubber becoming dearer year by year, it was made necessary that the manufacturers of rubber goods should look elsewhere for supplies of the crude article, and it would seem, from what follows, that nature has provided a good substitute for the rubber tree.

James A. Bundy, for many years a gutta-percha operator in the Guianas, on a recent trip of investigation through Brazil, found the balata tree growing in abundance near Para and on the Amazon and its tributaries for thousands of miles. The Brazilians had no knowledge of its gum-producing qualities, and for years had been cutting down the trees for fire wood and building material. After persistent effort, Mr. Bundy succeeded in interesting the parties in Para, bought a concession, and has lately begun the work of producing gutta-percha for the market.

The balata, or bulle tree (Minsaps balata,) known in the Brazilian language as the macaranduba, grows in great abundance throughout the Amazon valley, but up to this time, no attempt has ever been made to introduce the gutta-percha trade in that country. Balata trees may be found scattered in groves, sometimes amounting to forests many miles in extent, all over the States of Para and Amazonas.

The method of bleeding the balata tree is entirely different from that used to extract gum in the rubber tree, and only experienced and expert bleeders can be employed. On the other hand, the balata tree yields many times as much sap as the rubber tree, and one man can easily produce many times the amount of gutta-percha in a day as twenty men can extract of rubber. The trees will average three and one-half pounds of gutta-percha each, and a competent bleeder can prepare forty or fifty pounds per day. The gum is first fermented, after which it is ready for shipment. It is surprising to find that this valuable gum, which is so easy of access, has never become known to the trade before.

NEW METHOD FOR - - - MEASURING FABRICS.

LETTERS patent for a unique device for measuring the length of fabrics have recently been granted to Herr F. C. Stephan, of Crimmitschau, Germany. The apparatus consists of a graduate paper band or tape, which is automatically wound up with the cloth. A similar device has already been employed for measuring fabrics, but when

time its outlet point is constantly altered, thus delivering the said measuring band or strip between the folded layers of the material or fabric *c* to be wound in a roll: the strip being first delivered at the farthest end from the front longitudinal edge *d* of the fabric. The fabric is then wound up together with the measuring strip, which during the operation is pulled out of the measuring band containing and delivering apparatus. The measuring strip, delivered from the apparatus, passes through an opening in a slide, which gradually moves forward and so

tion on lines *D* to *D* through the cover *t*. Fig. 1 shows the apparatus in plan view applied in position for use.

A box *f*, with plate *e* for securing the apparatus to the table top, is provided with a pin *g* for the reception of the measuring band roll *h*. The measuring band *b* from the roll is led around a guide pulley *i* and then through a hollow delivery channel *k*. The latter is provided with a slide *l* having two slanting delivery slots *m* for right and left winding and is covered with a top plate *n*. The roller *i* is fast on a worm wheel *o* carried in bearings in the box

the slide has reached the end of its path, it may be taken out and returned to its original position. A cover plate *t* is pressed by springs *uv* with its fore edge upon the measuring band roll *h*, so as to produce a certain resistance to the unrolling of the measuring band or strip, which should be greater than the resistance of the rotation of the worm gear. The cover affords at the same time a protection against the falling out of the measuring band roll *h*.

The Gape to Cairo Railway.

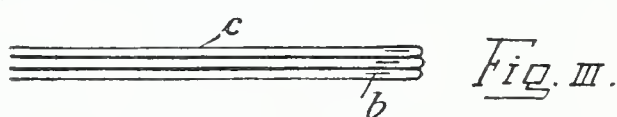
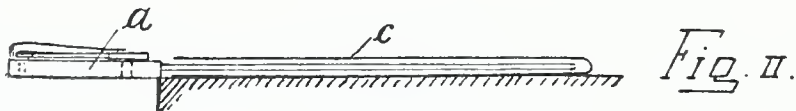
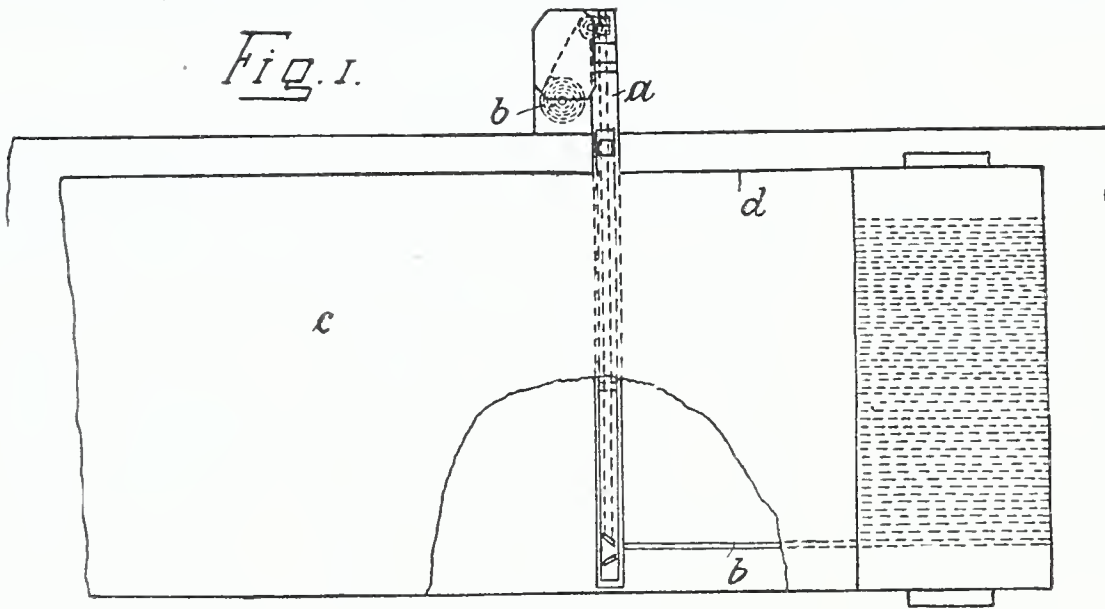
When the Duke and Duchess of Cornwall and York visited South Africa, they found a "train de luxe" in use on the Cape government line. According to the last report of the directors of the British South Africa Company, the train de luxe will soon be running between Cape Town and Bulawayo (1,500 miles).

In Rhodesia, railroad building is progressing rapidly, although the Boer war interfered with the transportation of construction and equipment material from the south. Meanwhile, the Beira-Salisbury line has been extended southward and a junction formed with the main line at Bulawayo. It was originally intended that the line Bulawayo via Gwelo to Salisbury should constitute the first section of the main line northward, toward Lake Tanganyika, and that the Zambesi should be crossed in the vicinity of Kariba Gorge. Later explorations, and particularly the discovery of the Wankie coal beds, have led to the adoption of a route farther to the west, including the crossing of the Zambesi at Victoria Falls. The railway is due to reach the coal fields during the coming autumn and Victoria Falls before the end of 1903.

On April 14, 1902, an agreement was signed in Brussels which would seem to constitute an important step toward the realization of the late Cecil Rhodes' "dream." Under the Belgian contract, the German route is abandoned, and the Cape to Cairo Railway will be carried through the Kongo Free State to the upper waters of the Nile. Instead of heading for Lake Tanganyika and German East Africa, the line will continue due north of Victoria Falls to the Kongo border, and thence via Katanga to Lake Kasali, which is the most southerly navigable point on the Lualaba (one of the principal reaches of the Kongo). Approximately, the distances to be covered are: Bulawayo to Victoria Falls, 3000 miles; Victoria Falls to Lake Kasali, 700 miles. From Stanley Falls on the Upper Kongo, a railroad will be built to Mahagi on Lake Albert Nyanza (480 miles), thus supplying the missing link between the Cape and the Egyptian railway nets. Such is the scope of the concession which Mr. Robert Williams obtained last month from the King of the Belgians. This project does not, however, necessarily replace the original central line through German territory, as planned by Mr. Rhodes and the German Government. In fact, it is quite likely, if the proposed railroad be built from the coast of Dar-es-Salaam, the capital of German East Africa (either through subsidy granted by the Reichstag or by private capital under State guaranty), that the original Cape to Cairo scheme via Tabora will be realized. Both lines may astonish the world before many years as full-fledged realities. All maps of Africa more than six months old are obsolete, because history is being made so rapidly in those regions.

In the development of the Dark Continent, as Africa is yet called, the United States is not at present playing a conspicuous part. Stanley's momentous work in the seventies has not been followed up by his quondam countrymen: nor is our trade with Africa, except Cape Colony, of relative consequence. It is to be hoped that more attention will be paid by our manufacturers and exporters to the African markets, and concerted efforts made to reach them.

Fig. I.



used for very fine goods, such as silks, velvets, satins, etc., it was found that an impression was left by the strip, which often rendered delicate materials unsalable. This was mainly due to

constantly alters the position of the measuring band, which latter is thus spirally wound in the cloth roll. In this manner, no two convolutions of the measuring strip will be superposed

f and gearing in a worm wheel *q* at the end of a spindle *p*. The spindle *p*, which is carried in bearings in box *f* and delivery channel *k*, is revolved, by unrolling the measuring strip,

Fig. IV.

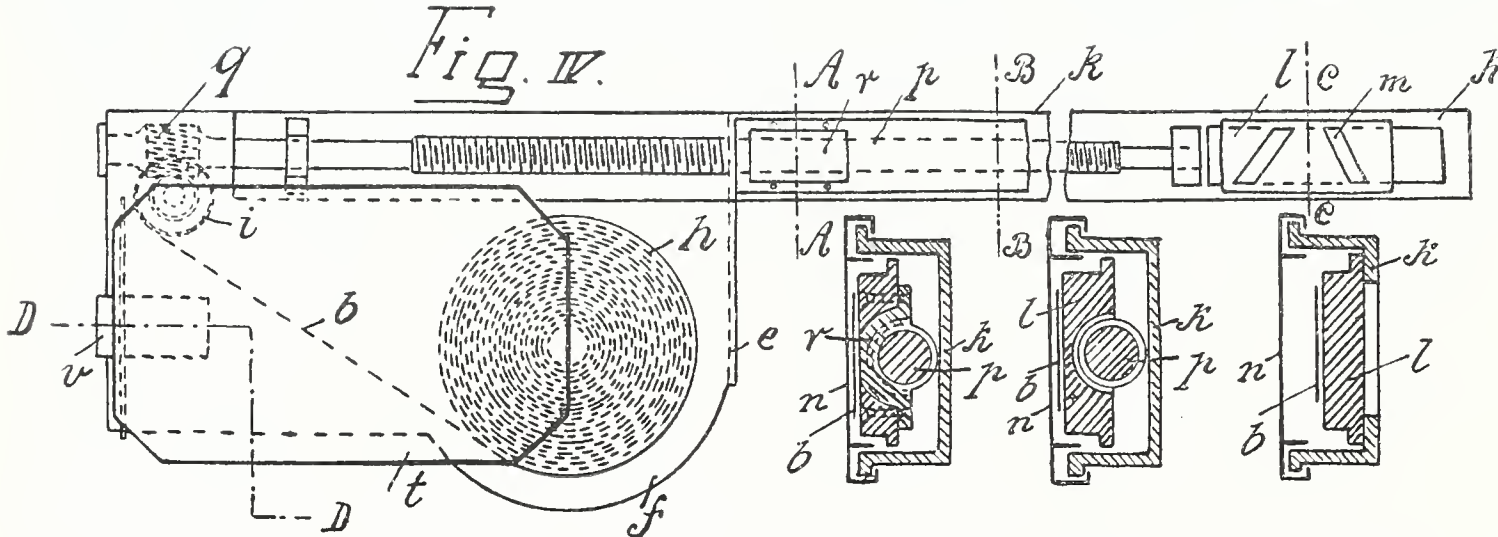
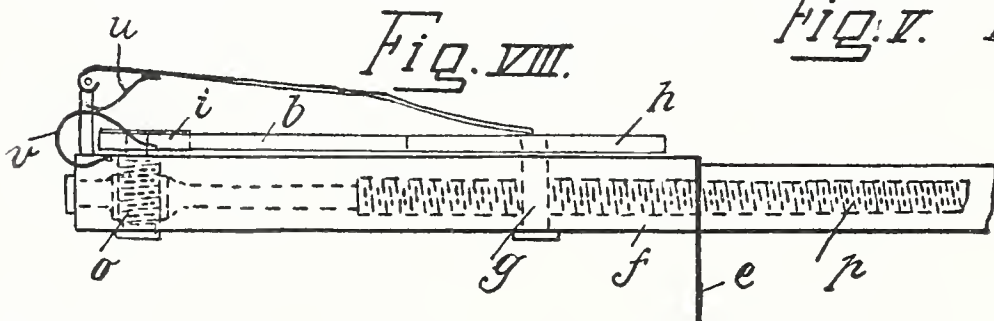


Fig. V. Fig. VI. Fig. VII.



the fact that the tape was wound in superimposed layers. The new device obviates this difficulty by constantly changing the position of the measuring band.

The apparatus *a* contains the roll of measuring band or strip *b* and permits its free withdrawal, while at the same

and thus make an impression in the face of the fabric.

The measuring band introducing apparatus is shown in Fig. IV, while Figs. V to VII are cross sections thereof taken respectively on lines *A* to *A*, *B* to *B*, and *C* to *C*. Fig. VIII is a side elevation of Fig. IV, taken in sec-

tion through the guide pulley *i* and worm gear *q*. The rotation of the spindle *p* operates a semi-screw nut *r* and thus moves the slide *l* endwise, the nut *r* being fixed to the slide *l* and engaging in the screw threads of the said spindle. In this manner, the slide with the delivery slot *m* moves gradually farther away from the measuring roll *h*. After

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Garment supporting webbing.....C. A. Spurgin
Gas engine.....T. Doherty
Gas generator, Acetylene.....A. Karg
Gas, Making carbonic acid.....V. W. Riesberg
Gas producer.....J. A. Herrick
Gas retort.....C. W. Isbell
Gas traps, Apparatus for protecting seals of sewer.....J. P. Putnam
Gate.....G. W. Simons
Gate.....T. A. Hill
Gem setting.....R. S. Bieber
Glass furnace, Electric.....A. Voelker
Gold and silver ores, Treatment of.....S. Trivick
Grading machine, Road.....R. E. Burke
Grain, Apparatus for malting, drying, or otherwise treating.....J. Sleeman
Grinding mill, Centrifugal.....J. H. Pendleton
Grip actuating mechanism.....S. S. Webber
Guns, Range finder attachment for.....A. P. Collins
Guns with independent line of sight, Apparatus for sighting.....C. P. E. Schneider et al
Hair fastener.....W. P. Dug Lany
Hammer, Power.....W. Bauermeister
Hand trap.....J. C. Porterfield
Harrow sulky attachment.....H. T. Faure
Harvester.....W. S. Washburn
Harvester, Beet.....H. G. Hotchkiss
Harvester, Corn.....J. E. Wood
Harvesting binders, Grain packer for.....D. H. Thurston et al
Heating furnace.....F. H. Daniels
Hod elevator or hoist.....F. C. Dey
Hoisting and conveying apparatus, Driving mechanism for.....W. F. Pillmore et al
Hoisting machine.....L. T. Pyott
Hoisting mechanism.....C. W. Carman
Hook and eye.....C. E. Devine
Hoops, Clamp for tank or like.....J. Weigel
Horn stand.....F. C. Hassett
Horseshoe, Calkequipped.....A. F. Schofield
Hose, Hydraulic or fire.....B. L. Stowe
Hot plate.....P. G. Van Wie
Hub, Wheel.....C. Anderegge
Hydrocarbon burner.....W. R. Jeavons
Hydrocarbon burner.....A. A. Arnot
Ice cutting or shaving machine.....F. H. Lippincott
Inhaler.....J. F. Breen
Ink well.....J. P. Mentzer
Insulator.....L. McCarthy
Internal combustion motor.....A. Vogt et al
Joint for pilasters, pillars, posts, &c.....W. Kopp
Journel box.....G. W. Lewis
Keyboard.....G. G. Allen
Key guard.....B. R. Bacon
Kinetographic apparatus.....A. C. Roebuck et al
Lacing eye for shoes, &c.....L. Ballbach
Ladder, Store service.....A. A. Coburn
Lamp, Compound incandescent electric.....H. Gilmore
Lamp, Hydrocarbon incandescent.....G. Washington
Lamp, Incandescent electric.....H. Gilmore
Lampblack apparatus.....J. L. Mann
Lampblack making apparatus.....J. H. Mann
Last.....F. J. Shainsey
Leaching ores, &c. Apparatus for.....G. Moore
Lifting jack.....O. E. Fields
Liquid heating or cooling apparatus.....H. Feldmeier
Liquids, Clarifying.....H. Lubberger
Load binder.....J. F. Neville
Locomotive boiler.....J. J. Gage

Loom..... F. Barlet
Loom for weaving tufted pile fabrics.....
Loom harness controlling mechanism.....
Loom picker check..... A. St. Andrews
Loom shuttle lock..... F. A. Mills
Loom stopping mechanism..... H. Cote
Loom swivel..... J. Wadsworth
Lubricator..... W. F. Richards
Lubricator..... F. W. Edwards
Mail bag catcher..... G. B. & J. C. Klink
Mail bag fastener and lock..... E. Stevenson
Measuring device..... C. Christensen
Measuring electric currents. Instrument for.....
Metal can..... J. N. Bradley
Metal crimping machine..... G. Cunin
Metal foil fabric..... H. L. Parker
Metal for electrical or other purposes. Means
and appliances for the manufacture of
covered strips of soft..... I. W. Heysinger
Metals in a finely divided state. Producing.....
Micrometer..... C. J. Banks
Millstones. Grooving..... J. Schweitzer
Molding machine..... J. R. Thomas
Molding machine..... J. N. Battenfeld
Mop head..... J. C. Look
Mortar composition..... E. K. Welch
Mortising machine..... C. J. Seaguest
Motive power engine..... M. T. Minogue
Motor..... W. Evans
Movements and indicating positions electric-
ally. Means for transmitting.....
Nut cracker..... W. A. Thiermann
Nut lock..... K. Hordish
Nut lock..... O. Baillargeon
Nut lock..... H. W. Langham
Nut lock..... F. Hart
Oar. Bow facing..... R. B. Hanson
Oil burner..... L. A. Pfeiffer et al
Ore separating apparatus..... B. C. Cook
Ores or slimes. Apparatus for the electro-
lytical treatment of..... F. T. Mumford
Oven. Baker's..... G. F. Smith
Packing. Metallic..... A. J. Zwart
Paint..... J. C. W. J. & R. E. Shaw
Paper blank feeding and scoring machine.....
Paper, &c. Machinery for folding, packing,
and stacking sheets of..... R. C. Seymour
Pen. Fountain..... P. E. Wirt
Permutation lock..... W. Beebe
Photographic developing case or dark cabinet.
Portable and separable..... T. T. Patchel
Photographic shutter..... W. F. Folmer
Pin..... G. W. Dover
Pipe bending apparatus..... W. Benson
Pipe hanger..... A. J. Beaton
Planing machine cutting tool..... E. H. Slater
Planter and fertilizer distributor. Combined
seed..... A. G. W. Foster, Sr
Plow..... O. L. Carmical
Plow and planter. Combined..... J. E. Park et al
Pneumatic despatch tubes. System and ap-
paratus for transmitting carriers in.....
Pneumatic elevator and weigher..... B. C. Batcheller
Pneumatic motor..... R. B. Hilleary et al
Pneumatic motor..... G. B. Anderson
Poke. Animal..... H. E. Irish
Pole reverser. Automatic..... M. Moskowitz
Precious metals from ores. Extracting.....
Precious metals from ores. Means for extract-
ing..... L. B. Darling
Preserving and storing building..... J. M. Stukes
Preserving apparatus. Food..... M. D. Ellis
Pressure generator..... G. E. Blake
Pressure regulator..... J. L. Schureman
Printing apparatus for use with machines for
making paper bags..... H. Holscher
Printing press. Web..... W. Spalckhauser
Propeller. Vibrating..... W. W. Phares
Pulp separator..... J. K. McLaughlin
Pulverized fuel burner..... F. M. Reed
Pump spring connection..... J. O. Bane
Pumping apparatus..... T. G. E. Lindmark
Pumping engine. Hot air..... J. T. Lally et al
Punch..... H. S. Temple
Race structure. Sack..... J. J. Wegner
Radiator attachment..... G. W. Chiple
Radiator. Warm air..... J. Clements
Rail joint..... K. Kohn
Rail joint..... H. O. Baldwin
Rail joint..... C. C. Osenbaugh et al
Rail joint fastener..... J. C. Wentzel
Railway. Electric..... W. B. Potter
Railway. Electric..... C. R. Campbell
Railways. Operating electric..... C. R. Campbell
Rake..... A. S. Elliott
Recording or registering the maximum move-
ment of any mechanism. Mechanism for.....
Releasing hook for handling logs, &c.....
Resistance of resilient devices. Means for
automatically regulating..... P. C. Ewart
Reversing mechanism..... O. Crosby
Revolving bar or counter..... P. J. O'Brien
Riddle..... E. Huber
Rivet heating and distributing system.....
Rock drill. Percussive..... V. R. Browning
Rotary engine..... Z. W. Daw
Rotary engine..... W. J. Mason
Rotary engine..... A. P. Charles
Rotary engine..... W. Alsop
Rotary engine..... G. E. Woodard
Rotary motor..... R. C. Sayer
Rotary motor..... C. A. & O. W. Hult
Ruffling and sewing machine..... R. G. Woodward
Rule. Measuring..... A. Latshaw
Ruling device..... B. H. Joy
Sash balance..... J. Barrow
Sash fastener and shade support. Combined.....
Saw. Double acting..... G. R. Peart
Sawmill carriages. Offset mechanism for.....
Sawmill feed..... J. J. Galway
Sawmill for railway mileage books. Computing.....
Scale. Price..... J. G. Goldfoot
Scale. Price..... L. T. Johnson
Scale. Price..... H. B. Sherwood
Scraper. Wheeled..... T. D. Radcliffe
Scuttle, bucket, &c..... E. M. Lockwood, Jr
Separable ring..... C. A. Kellogg
Sewer pipe connection..... F. W. Carlson
Sewing edgings. Guide for..... J. Davis
Sewing machine. Button..... B. T. String

Sewing machine. Eyelet..... D. Noble
Sewing machine folder..... W. L. Swift et al
Sewing machine hemming attachment.....
Sewing machine presser foot locking me-
chanism..... T. F. Dennison
Sewing machine take up and tension..... H. A. Klemm
Shade bracket..... A. Godfrey
Shade holder..... F. Yahn
Shaft mounting..... T. B. Nowlin
Shield. Adhesive..... H. McCormack
Shoe turning machine..... W. J. Muller
Shutter. Window..... A. Eppler, Jr
Sifter. Ash..... J. G. Busch
Signaling system and apparatus used therein.
Electric..... I. H. Taylor
Silo..... R. G. Callum
Siphon for dispensing liquids..... G. W. Manlove
Skirt supporter..... A. Kleinfeldt
Skirt supporter..... L. H. Flory
Smoke consumer..... L. E. Hachelle
Speed device. Variable..... W. T. Keogh
Speed mechanism. Variable..... B. M. W. Hanson et al
Speed regulator..... R. K. Le Blond
Spinning and twisting frame..... J. E. Johnson
Spoke tightener..... Ring..... A. Hitchon
Square and protractor. Combination..... V. J. La Baue
Stacker. Hay..... E. Oehrle
Stacker. Pneumatic..... T. Cascaden, Jr
Stacker. Straw..... J. H. Edward
Staging clamp..... J. B. Bartholomew
Stamp attaching and affixing machine..... J. Lally
Steam engine..... J. A. Chambliss
Steel. Manufacturing basic Bessemer..... J. A. Jenney
Stirrup strap..... S. McDonald
Stone handling apparatus..... L. P. Wellman
Storage system..... C. N. Owen
Stove. Gas..... J. R. Rector
Stove. Heating..... J. C. Forster
Stove leg. Extension..... H. R. Oney
Street sprinkling device. Automatic..... J. Barbee
Stretching..... T. D. Young
Strong light body and producing same..... F. X. Aigner
Suit hanger..... J. E. Seeley
Support. Adjustable..... D. B. Salmon et al
Suspenders..... A. Fleming
Suspension clamp..... J. M. Sundean
Switch..... J. R. Fletcher
Switch controlling apparatus. Fluid pressure
electric..... G. H. Smith
Switch operating mechanism..... A. Sundh
Tack machine form..... G. L. Cooper
Talking machine. Coin operated..... F. A. Snell
Tank or ice chest..... B. G. Royal
Telegraph transmitter. Mechanical..... T. B. Rogers
Telegraphy. Wireless..... J. W. McDonald
Telephone circuit..... H. Shoemaker
Telephone circuit..... I. H. Farnham
Telephone circuit..... M. H. Howell
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Tempering vat, churn, and butter worker.
Combined..... W. M. English et al
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Thermocauter..... P. M. Sharples
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Tiles. Setting..... T. M. Heaphy
Tire inflating device. Pneumatic..... J. H. Munro
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Tool..... J. H. Koch
Tool. Compound..... W. Offutt
Torch..... E. H. Wagner
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Toy..... H. T. Kingsbury
Toy bank..... H. T. Kingsbury
Toy cannon..... A. G. Fifer
Toy fence. Portable.....
Traction engine..... C. J. Jr., J. E. & L. A. Youse
Train connector..... S. S. W. S. & R. L. Morton et al
Train control system..... C. E. Felt et al
Train control system..... F. E. Case
Train lines. Cut off device for..... G. C. Moore
Train starting mechanism..... J. B. Blood
Tread or tire. Pneumatic..... F. L. Beaumont
Triangle..... C. W. Fuller
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Trolley track switch. Overhead tubular.....
Trolley wheel..... P. F. Werner
Trolley wheel..... R. H. Apelt
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Trousers hanger..... J. H. Howe
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Truck frame for railway cars..... J. M. Hansen
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Type writers. Paper feeding machine for.....
Type writing machine..... H. C. Tobey
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Underskirt. Lady's..... C. L. Hermann
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Valve. Fluid pressure regulated gas..... A. Beler
Valve for gas or gasoline engines. Mixing.....
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Vegetable roots. Machine for cutting..... H. Webb
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Vehicles. Machine for handling..... G. E. & J. S. Myers
Veneer box making machine..... W. H. Stout
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Washing machine..... A. C. Israel
Watch winding device..... G. M. Sawyer
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Water wheel..... E. E. Menges
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Weigher. Automatic grain..... A. & J. H. McLeod
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Whiffletree attachment..... N. Reisner
Window brace and fastener..... O. J. Jenks
Window guard..... H. P. Culver et al
Wood plate cutting machine..... A. Smith
Wood shapers. Antifriction collar for..... T. S. Crapp
Wrench..... C. C. Fields
Wrench..... P. Taroli
Wrench..... A. L. Slater

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Badge..... M. J. Kane
Flag..... A. R. Connor
Range..... 4 pats. R. H. Westerfield

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Advertising device..... W. D. Butt
Advertising match box and cigar tip cutter.
Combined..... W. R. Moore
Aeroplane covering..... I. Lancaster
Air brake order system. Automatic..... D. W. Jewell
Air compressor..... G. H. Abrams
Air compressor. Compound..... G. E. Martin
Air feeding device..... W. D. Douglas
Air. Means for utilizing compressed..... E. Hayward
Alumina. Manufacturing..... C. M. Hall
Applicator..... A. W. Ellington
Armature winding for induction motors.....
Article attacher..... 2 pats. A. H. Armstrong
Astigmatically corrected wide angle objective..... H. H. Sims
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Awning protector..... C. H. Hansen
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Bath tubs or the like. Overflow attachment
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Binder. Loose sheet..... J. B. Irving
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Bottle attachment..... L. S. De Forest
Bottle caps. Tool for removing..... W. L. Dunham
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Bottle. Non refillable..... J. Ewald
Bottle stopper..... A. Blumer
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Box joint..... B. A. Lange
Box lid holder and label dispenser..... J. W. Wright
Bridge. Swing..... C. Worthington
Bromindigo. Making..... M. von Gallois
Brooder..... W. P. Jones
Buckle or fastener for bale ties or the like.
Clamp..... W. R. Sturgis
Buckle. Tongueless..... G. Schneider
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Bunsen burner..... W. Kappel
Buoy..... W. S. Crouch, Jr
Buoy..... W. S. Crouch, Jr
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Calcing apparatus. Plaster..... A. Lawrence
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Canopy..... E. G. Burland
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Cant hook clasps. Die for making..... O. Rudd
Car body bolster..... G. G. Floyd
Car body bolster..... J. V. McAdam
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Car. Convertible..... H. Romunder
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Car fender..... O. M. Prouse
Car grain door. Railway box..... J. W. Wood
Car or engine replacer..... F. J. Fewings
Car platforms. Trap door for..... J. G. Lawler
Car uncoupling mechanism..... J. A. Chubb
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Carbid holder..... F. Simonson
Carburetor..... J. Rush
Card list or index..... W. Lumley
Cards. Game..... B. H. Sharp
Carpet cleaning machine..... J. C. Brady
Cartridge holder. Blank..... M. J. Shimer
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Celery bunching device..... L. Doppelmayr et al
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Chemical apparatus..... R. C. Robinson
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Cigar perforator..... S. Mountford
Cigar pocket. Paper..... O. L. Parmenter
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Clarinet..... W. Heckel

Clasp..... C. A. Bryant
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Clock. Electric..... H. G. Willette
Clothes drainer..... H. Blenkhorn
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Coaster brake..... C. Glover
Coating one metal with another metal..... S. H. Thurston
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Coin delivery device..... J. M. Butcher et al
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Corn husker..... A. W. Richards
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Counting machine..... S. E. Heineman
Crate..... R. De Wright
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Cream separator..... J. Seither
Cross tie..... J. E. Burns
Crushing and pulverizing machine..... L. Herman
Cultivator..... A. J. Comstock
Cultivator..... F. G. Hoag
Curette..... C. W. Spaulding
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Current protection. System of strung..... F. B. Cook
Curtain pole. Ringless..... H. H. Duncan
Derick..... A. Hodgson
Diffusion. Continuous..... F. Kessler
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Domestic boiler..... J. A. Bernardi
Door or window fastening means..... J. W. Nippert
Door signal or alarm..... H. C. Atkinson
Door stop and catch. Combined..... J. Daniel
Doors. Means for automatically closing swing-
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Dough mixing and kneading apparatus..... F. Brackett
Dress shield..... E. M. Cowles
Drill rod grab..... J. H. Adams
Drilling rivet holes in wheel hubs. Machine
for..... G. H. Everson
Drum stand..... A. B. Hellenkamp
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Dye and making same. Black sulfur..... I. Levinstein et al
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Dyeing, &c. Apparatus for..... C. Corron
Ear drum. Device for protecting the..... F. D. Macbeth
Egg opener..... A. F. Gardiner
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Electric cable..... T. Rosati
Electric distribution system..... H. F. Parshall
Electric light fixture. Marine..... G. L. Martin
Electric lighting systems. Regulation of..... J. L. Creveling
Electric machinery. Control of dynamo..... E. R. Carichoff
Electric meter..... C. D. Haskins
Electric meter..... E. Thomson
Electric switch..... E. R. Carichoff
Electric switch..... F. A. Merrick
Electric testing apparatus..... P. E. Chapman
Electric wire conduit..... R. W. Lyle
Electric wires. Device for stringing..... J. W. Seaman
Electrical apparatus. Therapeutic..... I. E. Shaffer
Electrical circuits. Terminal box for protected..... F. B. Cook
Electrical distribution system..... R. Fleming
Electrical distribution system. 3 pats..... C. P. Steinmetz
Electrical protector set..... F. B. Cook
Electrical switch or cut off..... P. Kennedy
Electrically controlled switch..... W. L. R. Emmet
Electricity. Chemical generator of..... E. L. Anderson
Electrochemical apparatus..... C. C. Clark
Electrochemical generator..... H. S. Amwake
Electrode for storage batteries..... C. W. Kennedy
Elevator operating mechanism..... W. W. Hubbard
Elevator stop..... E. C. Edwards
Engine reversing gear..... 2 pats. V. W. Clough
Engine stop..... H. Jones
Engine tender. Traction..... A. Hildebrand
Engines. Sparkers for explosive..... H. H. & C. B. Segner
Explosive engine. Multiple cylinder..... G. S. Andres
Explosive vapor engine. Four cycle..... G. Erikson
Eyeglasses..... J. Carter
Eyeglasses or spectacles..... C. O. Bailey
Fan operating device..... N. F. Warlick
Fastener..... W. B. H. Dowse
Feed water heater and purifier..... H. J. Reynolds
Fence..... W. Crabb
Fence. Wire..... L. C. Hoover
Fence. Wire..... C. S. Beebe
Field gate..... C. P. Niles
File..... J. D. Allen
Filter and hydraulic press member..... M. A. Smith
Filter for recovering the liquid from slimes,
muds, pulp, or such like in connection with
cyanid or other chemical applications. Re-
volving vacuum..... G. J. & S. E. Fraser
Fire escape. Portable..... M. J. Johnston
Fire screen..... C. Poyner
Fireproof blinds, &c. Spring roller for..... W. R. Kinneer
Fireproof cement. Hydraulic..... W. R. Knox
Fish flaking machine..... E. M. Lawrence
Flashing lighthouse lanterns. Electric switch
for..... F. Mackintosh
Flood gate..... J. D. Penn
Floor key. Electrical..... E. C. Goodrich
Floor laying and nailing machine..... J. C. Daigneault
Flue stop..... J. Seither
Fluid compressor..... E. Sette
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Fuel. Artificial..... G. M. Dallas
Furnaces. Automatic feeder for straw burn-
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Furniture clamp..... W. L. Tuell
Furs or skins. Machine for removing hard
and stiff hairs from..... G. Lafrique
Galvanometer..... C. L. R. E. Menges

Game apparatus.....W. R. Hock
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Garment clasp.....B. G. Clark
Garment fastener.....C. E. Kasselman
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Garment supporter.....F. Spiering
Garter.....R. W. Schmelz
Gas burner.....A. Beler
Gas burner.....J. G. Koegle
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Gas from carbonates in a continuous manner.
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Gas generator, Acetylene.....A. C. Einstein
Gas meter, Prepayment.....J. Geen
Gas producer.....J. A. Herrick
Gas producer and recuperative furnace, Combined.....A. J. Maskrey
Gear for varying speed and reversing, Driving.....W. & G. F. Meischke-Smith
Gear, Reversing.....L. R. Jones
Gear, Reversing.....T. Holliday
Gearing, Multiplying.....E. Benoit
Gearing, Variable speed.....C. Stone
Gem cutting machine.....G. Purper et al
Glass finishing machine.....L. T. Zimmerly
Glass making machine.....H. Gollings
Glass tombstones, &c. Manufacturing.....J. O. Shaffer
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Glove.....J. Comrie
Golf ball.....E. Kempshall
Governor, Marine engine.....M. F. Volkman
Grading machine, Electric road.....J. W. Langfitt
Grate, Square shaking.....N. P. Foster
Grater.....N. P. Lucas
Grit mill.....C. B. English et al
Gun, Spring.....W. H. Pease
Hame fastener.....N. P. Erickson
Hanger for transformers or the like.....J. J. Wood
Harp.....K. Weigel
Harrow.....M. E. Johnson
Harvester and shocker, Combined cornstalk.....H. Peckham
Harvester, Corn.....E. D. Wallis
Harvesting apparatus, Peat.....A. Dobson
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Heating and ventilating apparatus, J. Kallgren
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Hoist, &c. Fluid pressure actuated.....E. B. Ridgway
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Hub, Vehicle.....E. Keen
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Hydrocarbon burner.....C. T. Pepper
Ice, Apparatus for manufacturing plate.....E. Barrath
Ice crusher for refrigerators.....F. H. Nichols
Ice, Manufacturing plate.....E. Barrath
Indicating device.....C. A. Christian
Jar closure.....W. B. McCrosky
Journal box.....A. G. Steinbrenner
Journal box lid.....J. W. Stephenson
Key fastener.....B. B. Downard
Key or musical instruments, Mechanism for effecting varying touch of.....L. Hupfeld
Knife cleaning machine.....H. Michaux
Knitting machine attachment, Automatic circular.....J. F. Bard
Knitting machine stop motion, Automatic.....2 pats.....G. W. Martin et al
Label with metal fastening clamp.....W. Siegfried
Labels with adhesives, Machine for coating.....F. E. Jagenberg et al
Lamp.....C. E. Gervais
Lamp.....G. E. Gervais
Lamp, Electric arc.....R. Fleming
Lamp, Electric arc.....F. A. Gilbert et al
Lamp extinguisher.....L. D. Lawrence
Lamp, Oil.....H. E. Bottlewalla
Lamp shade holder, Incandescent electric.....R. W. Schmelz
Lathe.....F. Lorch
Lathe, Engine.....W. T. S. Johnson
Laundry purposes, Polishing block for.....M. Lehmann
Lawn cutter and roller, Motor propelled.....W. P. Simpson
Lawn sprinkler.....P. Moderson
Life buoy, Night.....C. C. A. E. Wiese
Lifting gate.....A. Miller
Lifting jack.....J. C. Barley
Load retaining means for vehicles.....W. M. Cain
Location tracer.....H. S. Bacon
Lock.....H. W. Simpson
Locomotive emergency gear.....W. W. Murch
Lubricator.....O. G. Kipp
Machine wrench.....J. W. Aldridge
Mail bag catching and delivering machine.....W. B. Rohmer
Mail box.....W. N. Moore
Mail wagon door.....W. F. Shelly
Maize for the production of grits, flakes, &c. Treatment of.....T. T. Gaff et al
Maize or Indian corn, Degerming.....T. T. Gaff et al
Malt kiln, Pneumatic.....B. Berg
Mattress, Wire.....C. S. Lloyd
Measuring coal to gas retorts, Mechanism for.....W. R. Herring
Meat chopper.....L. B. Cobb et al
Medicated tampon.....E. M. Pord
Metal boring machine.....C. C. Roberts
Metal upon another, Impacting one.....S. H. Thurston
Metal working tool.....A. Tindel
Metering system, Multirate.....A. D. Lunt
Micrometer gage.....R. J. Simpson
Milk can.....H. S. Reynolds
Molding machine.....C. Herman
Mosaics, Means for setting.....F. Alcan
Muffler.....H. N. Molsinger
Muffler, Exhaust.....R. E. Bousfield
Nut lock.....R. Kantner
Oil and making same, Paint.....J. F. Krebs
Oil hole protector.....F. L. Everhardt et al
Oil, Paint.....W. E. Dempster
Oil retaining box.....G. W. Wilmot et al
Opera glass, Folding.....E. Batault

Ore concentrator.....H. S. Bailey et al
Ore roasting furnace.....D. C. Jackling
Packing holder for piston rods.....A. E. Macindoe
Pail, Slop.....R. Logan
Paper bag fastener.....S. S. Smith
Paper making machine.....J. F. Richards
Pellet or tablet making apparatus.....E. Petranyi
Perambulator.....C. W. R. Schulze
Photograph attachment.....M. M. Worthington
Photographic films, Apparatus for developing and fixing cartridge.....M. Reichert
Photographs in relief, Producing.....W. Ohse
Photosculpture apparatus.....W. A. C. Selke
Piano player, Pneumatic.....S. B. Locklin
Pipe clamp.....H. P. G. Reed
Pipe hanger.....J. Crawford
Pipe wrench.....W. Holmes
Pistol.....G. Troxler, Jr
Plane.....A. L. Lundgren
Plane.....J. A. Traut
Plant pot or holder.....H. Hart
Plate holder, Magazine.....C. P. Goerz
Plow.....S. Fannin
Plow attachment.....W. H. Holsclaw
Plow brace.....D. W. Harris
Plow, Sugar beet.....J. T. Leinberger et al
Plows or the like, Attachment for.....H. H. Allen
Pneumatic despatch apparatus.....J. T. Cowley
Poke, Animal.....S. F. Webb et al
Pole cap, Wagon.....P. Holmstrom
Potato creamer.....F. W. Ruckstuhl et al
Power, Electric transmission of.....E. M. Hewlett
Power transmitting mechanism, Differential speed.....S. Jackson
Printing press.....H. B. Allen
Printing press addressing attachment.....J. P. Bryan
Printing press controlling mechanism, 2 pats.....W. C. Williams
Printing presses, Gripper for platen.....A. L. Anderson
Projectile.....J. B. Semple
Pulley, Sheet metal.....C. A. Brinley
Pulley, Split.....H. W. Finch
Pulverizing shoe.....H. F. Deterding
Pump.....B. Ivor et al
Pump attachment, Beer.....E. A. August
Punching bag platform.....S. Treinis
Punching machine.....B. F. Hall
Punching machine.....J. E. Scott
Rabble carriage.....D. C. Jackling
Rail fastening.....W. P. Patrick
Railway gate.....J. Bowman
Railway switch.....C. Johnston
Railway switch danger signal, Automatic.....C. H. Remington
Railway tie, Metallic.....J. F. Doyle et al
Railway tie, Metallic.....J. F. Weisbrod
Railway track appliances, Sod line cutter mechanism for.....V. Berford
Railway track foundations, Beam for.....L. B. West
Railway wagons, Controlling device for couplings of.....A. Brooker
Ram, Hydraulic.....W. L. Deming
Range finder.....I. N. Lewis
Razor cleaner.....E. F. Ogborn
Receptacle, Non refillable.....H. W. Avery
Recorder.....E. A. Neubauer
Refrigerating apparatus, Absorption.....N. W. Condict
Refrigerating apparatus, Still for absorption.....N. W. Condict
Refrigerating machine.....W. J. Woodcock
Refrigerator car.....W. J. Hughes
Retort mouthpiece clamp.....J. C. Dods
Reversing mechanism.....F. M. Brown
Reversing mechanism.....C. W. James
Rolling car wheels, Machine for.....H. V. Loss
Rolling mill.....P. Girin
Rolling mill, Rod.....C. A. Nighman
Rolling rods.....C. A. Nighman
Rotary engine.....J. N. Edwards
Rotary engine.....J. P. Pollard
Rotary motor, Two cycle.....P. A. Dupont
Sad iron handle.....2 pats.....W. B. Fenn
Safe.....W. E. Arnold
Sash lock.....V. R. McBride
Sash lock.....N. M. Hutton
Saw set.....D. W. Solomon
Sawing machine, Circular.....W. Miller
Scoop and scraper.....W. R. Lee
Scrapers, Safety catch for wheeled earth.....C. J. Whiting
Scuttle covers, Means for operating and locking.....E. F. Johnson
Scythe snath fastening device.....P. Forbes
Selective system, Automatic.....C. D. Ehret
Semaphore signal, Automatic electromechanical.....J. J. McGill
Sewing machine pull off mechanism.....J. L. Kieffer
Shade roller and curtain pole holder, Combined.....H. S. De Sollar
Ship construction.....A. B. Wolvin
Signal by electromagnetic waves, Apparatus for.....3 pats.....R. A. Fessenden
Signaling, Wireless, 3 pats.....R. A. Fessenden
Sine extractor.....J. C. Scannell
Singletree clip.....C. J. Burch
Skate, Automatic cycle or bicycle.....E. E. Ries
Sleeper or tie, Metallic.....J. I. Newburg
Snow guard or fender.....F. A. Peter
Snow plow.....P. W. Martin
Soap holder, Pendant.....R. H. Neumann
Soap press.....J. J. Forster et al
Soles, Machine for making pieced.....G. E. Warren
Spark and cinder arrester for locomotive smokestacks.....L. C. Laurent
Speed indicating system.....J. L. Hall
Spinning head.....F. A. Breeze
Spinning machine, Twine.....R. A. Myers
Spoke for vehicle wheels, Elastic steel.....H. G. M. Howard
Stack former and protector.....E. M. Stipp
Stall for cattle, Folding.....R. A. McLery et al
Statuary or other ornamental structures, Forming.....F. Peano
Steam boiler.....J. J. Hoppes
Steam boiler.....J. Platko
Steam generator or hot water heater.....W. H. Page
Steam trap.....W. H. Reynolds
Stitching machine, Wire.....F. P. Rosback
Stock and die.....H. L. Manson et al
Stove.....W. H. Null
Stove, Cooking.....R. Galbraith
Stove door hinge.....F. L. Sheppard

Stovepipe attachment.....W. H. Etcheson et al
Stoves, Heat reflector for.....B. C. Oblinger et al
Strainer, Sink.....S. F. Williams
Stuffing box for piston rods.....D. W. Dougan et al
Suckers or drinking tubes, Machine for making.....L. H. Britton et al
Superheater and steam generator, Combined.....R. Schulz
Suspended carrier.....R. A. Bruce
Suspender attachment.....C. R. Harris
Switch stand, Upright automatic.....D. H. Foreman
Switch throwing device.....T. J. Kent
Tables, chairs, &c. Collapsible support or frame for.....F. Mack
Tape inserting and stitching mechanism.....M. H. Powell
Tape into edging, Machine for inserting.....M. H. Powell
Tape into edging, Machine for inserting.....E. P. Hatch
Telegraphy, Apparatus for wireless.....2 pats.....R. A. Fessenden
Telegraphy, Conductor for wireless.....R. A. Fessenden
Telegraphy, Multiple.....2 pats.....M. I. Pupin
Telegraphy, Wireless.....3 pats.....R. A. Fessenden
Telegraphy, Wireless.....H. Shoemaker
Telephone cable connection.....T. P. Jones
Tempering bath.....J. E. Lawrence
Theatre, Portable revolving.....C. F. Bramhall
Thresher screen.....J. H. Jensen
Tile press.....X. P. Gilardoni
Tire setter.....F. W. Mitchell
Tire valve, Pneumatic.....H. W. Hodgetts
Tire, Vehicle.....F. E. Osgood et al
Tobacco pouch.....G. Frank
Tool, Fluid pressure operated.....J. V. W. Reynders et al
Tool shanks, Machine for making tubular.....F. P. Bates
Tooth powder or other material, Receptacle for.....J. C. Allen
Torch, Vapor burning.....W. Mitchell
Toy.....F. A. Richter
Toy.....J. J. Fitzpatrick
Toy banks, Slot guard for.....J. W. Eshleman
Toy bowling alley.....F. W. Gibson
Toy cart.....F. H. Harris
Toy, Top spinning.....G. R. Mann
Traction engine.....J. S. Pfremmer
Transforming apparatus, Rotary.....E. W. Rice Jr
Trolley wires, Treating.....A. Springer
Trowel.....E. A. Benninghofen
Truck, Car.....2 pats.....G. C. Murray
Tru k, Locomotive.....E. Shay
Truss rod beam.....A. W. Henry
Tubes, &c. Making collapsible.....L. Feval
Tubing, Machine for making spiral.....G. E. Grimm
Type writer.....C. Sears
Type writer card holder.....L. S. Burridge et al
Type writing machine.....E. B. Cram
Type writing machine.....W. R. Fox et al
Urinal.....H. D. Jones
Valve for gas engines, Fuel.....J. B. Fenner
Valve, Governor.....L. J. Watson
Valve lubricator.....P. F. Laban
Valve mechanism.....R. Berg
Valve mechanism, Explosive engine.....R. P. Hansen
Valve, Pressure reducing.....C. H. Buckelew
Valve, Retaining.....W. V. Turner et al
Valve, Steam.....H. W. Waite
Vanner.....C. C. Pratt
Vegetable or meat cutter.....F. Barr
Vehicle.....A. A. Kellogg
Vehicle brake.....W. F. Hitchcock
Vehicle brake.....G. W. Burton
Vehicle frame.....J. Dawson
Vehicle, Motor.....H. J. Marks
Vehicle top.....L. Gillaspay
Velocipede driving gear.....F. A. Rich
Vessel, Tilting.....A. J. Betteridge
Wagon boxes, Dumpboard for.....L. L. Haworth
Washbench.....L. A. Robbiss
Washing machine.....L. B. Parker
Watch, Stem winding.....C. T. Higginbotham
Water closet bowl.....P. J. McGuire
Water closet bowls or washbasins, Mechanism for temporarily locking.....E. Woodruff
Water closet seat.....W. C. Anderson
Water cooling tower.....C. H. Wheeler et al
Water gage attachment.....F. J. Knox
Water tube boiler.....N. Vicente
Wave motor.....H. Williams
Wave power, Device for utilizing.....J. C. Hergenhan et al
Wave responsive device, Current actuated.....R. A. Fessenden
Weaner, Calf.....L. H. Saunders
Web folding machine.....R. C. Seymour
Weighing machine, Automatic.....U. S. James
Weighing machine feeding apparatus.....W. E. Nickerson
Weir, Self adjusting.....C. C. Carlisle
Welding and tapering sockets.....P. Boyd
Welding and tapering sockets, Apparatus for.....3 pats.....P. Boyd
Whiffletree clip.....W. R. Ayer
Windmill controller.....W. J. Banish
Window cleaning apparatus.....S. C. Lawlor
Window fastener.....W. W. Potter
Window locking device.....J. Wanless
Window screen.....M. Kolf
Window ventilator.....D. O. Davis
Wire bending machine.....G. F. Pross et al
Wire tie, Stay.....I. Imbler
Wire tightener.....T. Spriggs
Work holder.....E. G. Couch et al

DESIGNS.

Automobile body.....C. M. Taylor
Bottle, Prescription.....H. Forest
Desk casting, School.....M. A. Donohue, Jr
Lamp or candle shade.....R. Strasburger
Mirrors, brushes, or similar articles, Back for.....W. Turton
Nebulizer support.....W. & J. Boekel
Picture frame.....I. M. Gould
Pin, Pendant.....G. C. Van Rode
Range.....R. H. Westerfield
Sewing machine table.....H. J. Abramson
Sewing machine table.....F. G. Hogland
Silver or plated ware, Metal ornament for.....S. W. Babbitt

Skirt holder plate.....L. Wertheimer
Spoons or similar articles, Handle for.....3 pats.....E. Crees et al
Spoons or similar articles, Handle for.....W. F. Marshall
Stove.....H. D. Perky

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Acid and making same, Methylene di-aceto-diacetylic.....S. L. Summers
Acid ester of methylene diguaiaacol and making same, Camphoric.....S. L. Summers
Adding machine.....H. Ellis et al
Adjustable furnace.....R. Halley
Advertising device.....W. D. Butt
Air from sand blast apparatus, Apparatus for cleaning.....J. E. Mathewson
Air heating apparatus, Compressed.....G. W. Hopkins
Albuminous substances, Obtaining.....A. Jolles
Amalgamator.....G. H. Breyman
Atropinum alkyl nitrate.....H. Dresser et al
Augur, Packing.....E. E. Ziegenfuss
Autographic register.....J. C. Shoup
Automobile.....J. C. Henry
Automobile running gear.....A. A. Medina
Automobile steering gear.....J. G. MacPherson
Automobiles, Transmission gear for.....G. P. Dorris
Balls, Manufacture of playing.....E. Kempshall
Bard cutter and feeder.....W. N. Crow
Bark from trees, Apparatus for removing.....W. P. Kidder
Beam machine, Reciprocating.....N. H. Seeley
Bearing.....M. Steiner
Bearing for lawn mowers, Ball.....A. B. Case
Bearing for shafts of machines.....N. H. Seeley
Bearing, Roller.....J. D. Twigg, Jr
Belt, Conveying.....J. J. Ridgway
Revel and miter, Combined.....C. R. Stedman
Bicycle.....W. N. Whitely
Bicycle gear, Changeable.....P. J. Scharbach
Bicycle lock.....J. C. Fisher
Bicycle toe clip.....G. W. Cole
Bicycles, Device for coupling two.....J. Kynaston
Bicycles or like vehicles, Cushion frame for.....J. H. Sager et al
Binder needle.....E. Will
Boards by means of cleats, Machine for securing together.....C. Johnson
Boats, &c. Apparatus for removing material from.....3 pats.....A. M. Acklin
Boiler.....A. W. Oldelt
Boiler and its furnace.....S. A. Graham
Boiler furnace, Steam.....2 pats.....J. R. Bailey
Boiler or water heater.....D. M. & A. B. Burns
Boot or shoe welt.....J. O. Bicknell
Bottle, Non refillable.....E. I. Allen
Bottle, Non refillable.....S. D. Blocker
Bottle, Non refillable.....T. E. Shortell
Bottle, Non refillable.....E. Hoerichs
Bottle stopper.....J. J. Allison
Bottle stopper.....A. C. Packer
Bowls or basins, Clamp for marble wash.....W. McClintock
Box fastener.....W. Jordan
Braids and trimmings, Machine for making.....J. E. Kirberg
Brake.....A. R. Moore
Brake beam.....B. Haskell
Brake, fender, and step, Combination.....D. Neale
Brick machine.....2 pats.....W. F. Stimpson
Brooder.....O. R. Lincoln
Broom handles, Polishing and drying.....C. A. Ridlon
Buckle, Back band.....E. H. Crum
Building material, Box of.....O. Nentwig
Burglar alarm.....J. H. Howard
Burner.....2 pats.....M. S. Walker
Button.....reissue.....G. W. Buchanan
Button and making same.....M. D. Shipman
Button feeding mechanism.....J. Hornby
Button making machines, Grip carrier for.....J. Hornby
Button making machines, Segmental gear for.....J. Hornby
Button making machines, Spindle adjustment for.....J. Hornby
Button setting machine.....E. B. Stimpson
Cable support.....J. E. Gamalielsof
Cable track roads, Support for suspended.....H. M. Harding
Camera, Magazine.....W. G. Perks et al
Camera, Photographic.....H. W. Hales
Camphene, Making.....2 pats.....K. Stephan
Can opener.....J. Chisholm
Can opener.....J. W. Pierce
Cane stripper, Sugar.....T. A. Dutton
Canopy.....F. C. Winants
Car brake.....W. House
Car coupling.....P. Hien
Car coupling, Automatic.....J. M. Stanley
Car door mechanism.....E. J. Muller
Car door operating device.....J. Simonton
Car haul.....J. W. Bollinger
Car heating apparatus, Railway.....J. Q. C. Searle
Car, Metallic railway.....R. H. Hornbrook et al
Car, Railway.....G. W. Chiple
Car wheel.....G. Killian
Carbureter.....E. Walther
Carpenter's tool.....M. F. Doyle
Carriages, Feed pump and connection for horseless.....J. C. Blevney
Cart, Ash.....W. Schaller
Cash register.....F. B. Barnard
Cash register.....F. H. Bickford
Cash register.....G. S. Green
Casks, barrels, or like vessels, Apparatus for lining.....H. S. Russell
Centrifugal machine.....H. De Raasloff
Checkreins, Elastic connection for.....J. M. Chafin
Cheese marker.....J. Wolfinger
Chute for loading wheat or flour on ships.....F. W. Brink
Clutch, Tug sheave.....H. B. Harding
Coal bagger.....H. B. Sackett
Cock, Hydrant.....J. H. Kidder
Coke, Manufacturing.....J. W. Seaver
Coke quenching or cooling apparatus.....L. Bertrand
Compartment box for checks or the like.....J. Hicks

Compress..... M. M. Kerr
 Condensing apparatus. Atmospheric steam... F. R. Braudt
 Cooking utensil. Steam..... G. F. Edmiston
 Cord holding device..... F. H. Knapp
 Corn pad..... I. Duckworth
 Corn shock loader for vehicles..... W. A. Tea
 Cotton gin..... J. T. Fuller
 Cuff holder..... W. C. Kewin
 Curb and gutter block. Combined..... J. R. Jecklin
 Current motor. Synchronous alternating..... 2 pats. A. Churchward
 Damper attachment. Stove..... J. R. Stover
 Deodorizing..... F. M. Pratt
 Detonating compound..... U. Alvisi
 Dish washing apparatus..... J. D. Morley
 Distribution system..... J. F. Kelly
 Door hanger..... P. H. Luitink
 Draft attachment..... C. H. Falk
 Draft rigging..... W. E. Coffin
 Drawing board and appliances..... P. Schlachter, Sr. et al
 Dredge. Hydraulic..... L. W. Bates
 Drilling machine..... F. N. Gardner
 Dye and making same. Anthracene..... 2 pats. O. Bally
 Electric motor controller..... W. H. Chapman
 Electric roller for massage and therapeutical purposes..... J. W. Gibbs
 Electrical distribution system..... W. S. Moody
 Electrical switch..... L. L. Elden
 Electrochemical generator..... H. S. Amwake
 Elevator safety device..... J. W. Fleming
 Elevator safety stop..... W. Fehler
 Elevator signal. Electric..... L. K. Curlett
 Elevators. Brake for motor shafts of..... E. W. Moon
 Elevators or the like. Safety suspending apparatus for..... R. Hainsworth
 Embroidery frame and holder..... J. H. Post
 Emergency brake..... C. Vogel
 Emery wheels. Apparatus for wetting..... E. R. Hyde
 Enamel sifting apparatus..... C. H. Zwermann
 Envelop..... L. A. Bennett
 Envelop..... C. A. Dunn
 Fastener..... J. E. Traver
 Fastener..... W. B. H. Dowse
 Fellies or the like. Attachment for cutting..... W. E. Swindell
 Fence. Wire..... M. D. Shipman
 Fencing. Wire..... M. D. Shipman
 Fibrous materials. Machine for circulating and separating waste..... J. Marshall
 Fifth wheel..... J. Watts
 Filter..... C. Hungerford
 Filter press..... F. M. Locke
 Fire escape..... D. Neale
 Fireproof building..... 2 pats. F. W. Cooley
 Fireproof ceiling and floor..... S. G. Brinkman
 Fluid pressure brake..... 2 pats. H. H. Westinghouse
 Folding box..... A. W. Beers
 Folding table..... G. E. Shorey
 Food. Cattle..... G. H. Hughes
 Foundation. Building subaqueous..... J. T. Ford
 Friction brake..... H. A. House, Jr.
 Fruit stemmer..... J. A. North
 Fuel feeding apparatus. reissue..... W. G. Stones
 Fuel. Manufacturing artificial..... E. J. Hoffman
 Furnace..... R. Halley
 Furnace..... 2 pats. J. Reagan
 Furnaces. Apparatus for increasing combustion in..... J. H. McConnell
 Furniture. Folding..... W. Wenneis
 Galvanic battery..... E. L. Slocum
 Galvanizing machine..... R. Heathfield
 Game..... W. M. Ways
 Game apparatus..... S. A. Akins
 Garment supporter..... B. L. Bargar
 Gas and steam convertible engine..... G. Dahlberg et al
 Gas generator. Acetylene..... 2 pats. D. W. Bishop
 Gas or other pipes. Pressure reducer for..... J. L. Geyer et al
 Gas producer..... L. L. Merrifield
 Gate..... H. P. Egedal
 Gate..... A. M. Lance
 Glazed structure..... J. H. Steffy
 Glove..... J. C. Allen
 Gluing machine..... W. F. Epperson
 Glycolic menthyl ester..... F. Hoffmann et al
 Golf ball..... A. T. Saunders
 Grain, &c. Apparatus for drying, cooling, or otherwise treating..... G. H. Hess, Jr.
 Grain separator..... C. Otto
 Grave filler..... U. H. Deering
 Gun carriage..... O. Behnke
 Gun carriage..... 2 pats. A. T. Dawson et al
 Gun carriages. Combined axle seat and shield for..... O. Lanber et al
 Hame fastener..... E. G. Bennett
 Hammer. Pneumatic..... C. K. Pickles
 Hammer. Pneumatic..... H. J. Kimman
 Hammer. Pneumatic power..... H. F. Massey
 Handle bar support..... L. S. Kallajan
 Harvester. Beet..... W. Gary
 Harvesting machines. Finger bar for..... J. F. Steward
 Hat brims. Machine for trimming curled..... F. C. Craw
 Hat. Ventilated..... J. Wolbrecht
 Heating apparatus..... J. D. Smead
 Heating boiler. Sectional..... E. O. Haskins
 Heel nailing machine..... B. F. Mayo
 Heel nailing machines. Means for detaching or releasing top lifts in..... E. A. Lougee
 Hoisting bucket mechanism..... A. Wirsing
 Holder..... H. P. Jones
 Hominy, meal, and grits drier..... W. L. Burner
 Horse protector..... R. M. Seebree
 Horseshoe..... F. Sheeley
 Horseshoes. Ice sandal for flat..... I. G. Howell
 Hot air furnace..... T. J. March
 Hydrocarbon vapor burning apparatus..... A. B. Macklin
 Ice, &c. Apparatus for elevating or conveying and transferring..... 3 pats. E. A. Wright
 Image projecting apparatus..... C. W. Carman
 Ingot mold..... J. E. Sweet
 Inhaler..... J. H. McCulloch
 Insulating joints for pipes..... F. E. Cleland et al
 Insulator for electric wires..... T. F. King
 Joints for intersecting wires or rods. Forming..... J. C. & W. J. Pope
 Journal bearing..... I. Metzger
 Keyhole guard..... F. H. Bos
 Knob attachment..... W. S. Bartholomew
 Lace. Electrodepositing metal on..... J. A. Daly
 Lace machine..... C. Martin

Lacing hook..... W. A. Dunham
 Ladders or the like. Antislipping foot for..... A. Kern
 Lamp. Carbureting..... G. Wedderburn
 Lamp. Electric-arc..... C. L. Knapp
 Lamp. Hydrocarbon..... G. R. Stillman
 Lamp. Incandescent electric..... E. S. Gardner
 Lamp. Incandescent gas..... G. Treseureuter
 Lamp sockets. Machine for molding incandescent..... C. A. Chase
 Lathe..... J. L. Osgood
 Leather skiving machine..... J. W. Poole
 Leer..... R. Naysmith et al
 Leg improver..... H. A. Rhonemus
 Leveling machine..... J. J. Heys
 Leveling rods. Extension fitting for..... G. S. Goodale
 Liquid fuel burner..... R. Halley
 Liquid separator. Centrifugal..... W. W. Marsh
 Loading or unloading device. Lumber..... W. Saunty
 Locomotive driving wheel..... L. H. Kenyon
 Locomotive pedestal..... T. E. Collins
 Loom stopping device..... W. T. Lucie
 Magnetic separator..... A. Dings
 Mail bag catcher..... G. W. Smith
 Mail bag receiving and delivering apparatus..... A. P. Hauss
 Mail receiving and delivering mechanism for railways..... F. H. Burr
 Match..... C. M. Bowman
 Match box. Combination..... C. St. Jacques
 Measuring the degree of exposure to light. Instrument for..... F. Schoeler
 Mechanical movement for nut making or other machinery..... O. C. Burdick et al
 Medical electrode..... G. G. Marshall
 Metal dressing machine..... F. P. Stiker et al
 Metal dressing machines. Slide for..... F. P. Stiker et al
 Milling machine feed mechanism..... W. R. Fox et al
 Mirror. Adjustable..... M. H. Moss
 Mixing machine..... E. Ruttkamp
 Mixing machine..... J. H. Elward
 Mop wringer..... J. von Kanel
 Motion converting mechanism..... J. Horrocks
 Mower. Lawn..... W. H. Heydrick
 Mower. Motor lawn..... T. & W. H. Coldwell
 Musical instruments. Operating sheet for automatic..... E. S. Votey
 Nail assorting apparatus..... 2 pats. B. F. Mayo
 Nail assorting apparatus..... A. D. Elliott
 Nail assorting machines. Raceway for..... B. F. Mayo
 Nail assorting mechanism..... B. F. Mayo et al
 Nail assorting mechanism..... C. C. Small
 Nebulizer..... C. Truax
 Needle threader..... O. A. Aicardi
 Negatives. Producing trichromatic half tone process..... F. E. Ives
 Nut lock..... W. Graham
 Nut lock..... J. P. Birmingham
 Nut wrench. Axle..... R. A. Moody
 Ordnance. Device for the prevention of erosion in..... H. Maxim
 Ore breaker..... A. C. Calkins
 Ores. Treating..... J. Herman
 Ores. Treating mixed sulfid..... E. Ferraris
 Oven. Rotary bake..... F. H. Van Houten
 Packing case or box..... C. Triebaut
 Packing structure. Cellular..... H. H. Higham
 Painting metal furniture. Drip pan for..... H. E. Crome
 Paper cutting machine..... C. D. Blackhall
 Paper machine. Wall..... C. B. Weston
 Pattern plate..... C. R. Davis
 Pegging machine..... J. E. Bickford
 Phonographs, &c. Recorder for..... H. V. Butterworth
 Photographic attachment for optical instruments..... F. E. Ives
 Photographic developer..... A. Eichengrün
 Photographic developing apparatus..... E. Rimailho
 Picker stick strap..... C. Faber
 Pigments. Making..... J. Lones
 Pitman coupling..... J. R. Carter
 Plane..... A. W. Stanley
 Plane. Grooving..... J. A. Traut
 Plane iron cap..... J. A. Traut et al
 Plane lift..... C. E. Riecker et al
 Plane. Recessing or grooving..... F. Clayton
 Plant protector..... L. J. Merriman
 Planter..... R. Murphy
 Plate handling machine..... R. R. Spears
 Pliers..... M. M. Howland
 Plow. Potato..... D. Jackson
 Plug receptacle..... C. J. Klein
 Plumb bob, level, &c. Combined..... D. L. McDermott
 Pneumatic tube systems. Pneumatic time lock for..... B. C. Batcheller
 Pole attachment. Carriage..... P. Masterson
 Post office box indicating mechanism..... T. F. Kelly
 Postal box and signal..... F. C. Bates
 Powder bag. Ordnance..... C. T. Dorr
 Precious metals. Treating rebellious ores of the..... W. F. Downs
 Printing machinery..... S. G. Goss
 Printing press..... S. G. Goss
 Printing presses. Adjustable and throw off roller track for..... A. W. Fritz
 Propellers of ships. Means for housing..... J. Hamilton
 Pulley mechanism. Reversing..... J. Darling et al
 Pump. Hydraulic..... W. Wagner
 Rail fastener..... C. M. Reed
 Rail joint..... D. H. Noble
 Rail joint..... O. S. Weddell
 Railway. Combined overhead and underground electric..... D. S. Bergin
 Railway joint..... T. L. Watts
 Railway rail joint..... E. R. Avery
 Railway signal. Automatic..... A. Emerson et al
 Railway signaling apparatus..... J. D. Taylor
 Railway signaling apparatus. Selector for..... J. D. Taylor
 Railway switching and signal interlocking apparatus..... J. D. Taylor
 Railway trains. Electric block system for..... J. T. Hambay
 Razor..... C. Freitag
 Rheostat or heater. Electric..... H. P. Ball
 Rheostats, electric heaters, &c. Resistance for..... H. W. Leonard
 Ribbon and stock supporter..... J. H. Whittington
 Rice hulling machine..... J. B. Cornwall
 Rock cutting apparatus..... F. Lobnitz

Rod reel..... B. H. Gedge
 Roof, ceiling, and floor construction..... B. McDougall
 Rotary engine..... W. F. Stanley
 Safe. Burglar proof..... D. Neale
 Sand and producing same. Artificial..... J. A. Shinn
 Sand blast apparatus..... A. G. Warren
 Sash weight..... G. A. Beckwith et al
 Sash. Window..... E. Heroux
 Sawmill set works..... J. Walton
 Saw slabbing machine. Twin..... E. E. Thomas
 Screw cap closure..... H. J. S. Hall
 Screw cutting die..... C. J. Jackson
 Scythe snath bending machine..... G. M. Penn
 Seal. Car..... J. N. Brunner
 Sealing machine. Bottle..... H. T. Gay
 Sewing machine. Chain stitch..... H. J. Hancock
 Sewing machine. Lock stitch shoe..... A. B. Fowler
 Sewing machine take up..... F. W. Merrick
 Shade adjustment..... F. H. Knapp
 Shade holder. Adjustable window..... F. D. Hewes et al
 Shade support..... E. A. Livet
 Shaft coupling..... R. W. Scott
 Shaft coupling. Power..... O. Rudd
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 Sharpener. Knife and pencil..... L. Johnson
 Silo..... E. B. Lacey et al
 Skirt protector..... J. Cathrein
 Skylight..... E. J. Hulse
 Smoke and spark preventing device..... W. S. Hughes
 Smoke consumer..... L. E. Morgal
 Smoking pipe..... A. S. Spiers
 Snow plow. Cylinder rotary..... H. H. Kryger
 Solder for soldering aluminium..... J. C. Webster
 Soldering iron..... J. C. Covert
 Speeds are exceeded by vehicles. Apparatus for indicating when certain predetermined..... A. F. Poilleuillain, (dit P. Villain)
 Spinning apparatus. Yarn..... G. O. Draper
 Spinning or roving machine..... W. V. Threlfall
 Square. Engineer's..... W. V. Cheternman
 Stacker. Pneumatic. reissue..... J. H. Elward
 Stamp affixer..... E. A. Bienenstok
 Stamp tappet..... C. C. Rueger
 Steam boiler..... H. A. Duc, Jr.
 Steam boiler. Water tube..... A. Mehlhorn
 Steam trap..... J. Bonar
 Steering machinery..... A. B. Brown
 Stock tank..... W. C. Wright
 Stones, &c. Apparatus for separating..... J. C. W. Stanley
 Stones or mortar. Composition for making..... J. Loewenthal
 Stove. Portable..... E. C. Leonard
 Stoves. Force draft attachment for..... S. J. Walker
 Street cleaning machine..... J. Thery
 Surveying and reconnaissance instrument..... J. C. Sala
 Swinging gate..... J. W. Renmes et al
 Switch stand..... J. J. Schrag
 Table lock. Pedestal extension..... E. Tyden
 Tablet. Manufolding..... B. F. Hoard
 Telegraph keys. Automatic circuit closer for..... J. E. Folsom
 Telephone receiver..... L. Mellett
 Temple attaching device..... F. G. Hirst
 Tent..... J. P. Nelson
 Threshing machine attachment..... J. G. Walker
 Tie plate..... C. S. Shallenberger
 Tile..... F. R. Lawrence
 Tile setting or removing apparatus..... H. Schmidt, Jr.
 Tire for vehicle wheels. Spring..... H. C. Shearman
 Tire. Vehicle wheel..... E. Belledin Gras et al
 Tool holder..... S. Welter et al
 Towing mechanism. Canal..... S. W. Wood
 Toy boat..... E. E. Mitchell
 Toy pistol..... C. F. Paulus
 Tram protecting rollers. Safety ball for..... E. Raus
 Trolley..... P. E. Loree
 Trolley lubricator..... P. E. Loree
 Trolley wires. Automatic line catch for..... G. R. Floyd
 Trousers supporter..... J. D. Aiken
 Truck slide and center bearing. Car..... E. Cliff
 Tube expander..... H. M. Barr
 Type bar for matrix plates. Master..... J. R. Reynolds
 Type chase for making matrix plates..... J. R. Reynolds
 Type writing machine feeding attachment..... M. S. Eylar
 Type writing machine ribbon fastener..... F. O. Garrison
 Umbrella. Folding..... A. & F. Schaefer
 Umbrella runner..... W. W. Kenney et al
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 Valve. Automatic..... N. Curtis
 Valve cushioning device..... E. Rost
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 Valve mechanism for steam carriage burners..... R. H. White
 Valve motion..... G. M. Schwend
 Valve. Quadruple..... F. Whiting
 Valve. Safety..... W. Wishart et al
 Vehicle body. Motor..... F. Charron et al
 Vehicle steering mechanism. Locking device for..... C. S. Van Wagener
 Vehicles. Brake for pivotal running gear of..... W. Wiedinmyer
 Vending machine. Coin actuated..... F. M. Sears
 Wagon body lifter..... G. H. Wade
 Wagon running gear..... F. H. Pickard
 Waist former. Long..... J. C. Kimsey
 Wall and bricks for same. Masonary..... A. H. Moses
 Washboiler..... G. Leeson
 Washing machine..... T. H. C. Beall
 Washing machine..... J. M. Lawrence
 Washing machine..... O. Guitar
 Watchcase..... E. Kuhn
 Water distribution..... W. O'Neill et al
 Water heater..... T. L. Phillips
 Wave detecting device..... H. Shoemaker et al
 Weed puller..... J. A. Whelan
 Weight motor and governor mechanism..... W. D. Bell
 Wheels and the product thereof. Molding spoke..... G. H. Dickerson et al
 Whips. Butt loading for..... H. W. Larsson
 Window screen..... O. Ouellette
 Wire machine. Barb..... H. Guernan et al
 Wire stretcher..... M. E. Shinn et al

Wood. Preserving..... T. Giussani
 Work carrier locking device..... J. Hornby
 Wrench..... R. J. Cosseboom

DESIGNS.

Bed case. Folding..... C. L. Gamer
 Box or carton..... F. Goetz
 Button hooks, paper cutters, or similar articles. Handle for..... T. W. Foster
 Coffee or tea pot..... H. Nutrizio
 Curtain. Lace..... 2 pats. A. Burgess
 Mirrors, brushes, or similar articles. Back for hand..... L. C. Porter
 Plate. Souvenir..... L. Wohltman
 Ring..... A. Becker
 Toilet boxes, mirrors, or similar articles. Back for..... T. W. Foster
 Type. Font of lower case printing..... B. Nadall et al
 Type. Font of upper case printing..... B. Nadall
 Zither body..... C. E. Brown

Issued August 26, 1902.

MECHANICAL PATENTS.

Abrading mechanism..... J. M. Nash
 Air or other gases and cooling by means thereof. Liquefying..... J. F. Place
 Air or other liquid gases. Vessel for holding and shipping liquid..... J. F. Place
 Alkoxy caffeine and making same..... F. Ach
 Amalgamating metals..... P. A. Knappe
 Amalgamator..... E. J. Kiss
 Amalgamator..... P. A. Knappe
 Anchoring post..... H. F. Farwell
 Anesthetic apparatus. Elastic..... H. Nierker
 Ash receptacle..... J. & M. Kracker
 Ash tray and advertising device..... O. J. Willmot
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 Baling press. Hay..... E. S. Mead
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 Basket webs. Machine for making..... P. F. Lindt
 Bearing. Antifrictional..... F. S. Seagrave et al
 Bearing. Shaft or axle..... J. C. Blevney
 Bed. Couch..... F. M. Tinkham
 Berry box..... C. B. Proctor
 Bicycle driving mechanism..... G. H. Spaulding
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 Billing machine..... B. W. Perkins
 Boiler combustion apparatus. Steam..... J. R. Fraser
 Boiler furnace. Steam..... H. H. Patterson et al
 Boiler water gage. Steam..... D. W. Rockwell
 Book support or copy holder..... G. W. Sawyer
 Bottle cap..... F. Recht
 Bottle cork wiring machine..... C. J. Warren
 Bottle corking machine..... C. J. Warren
 Bottle filling machine..... C. J. Warren
 Bottle. Non refillable..... E. Burns
 Bottle washing machine..... C. J. Warren
 Bottling machine..... C. J. Warren
 Bowling alley pin..... E. C. Phillips
 Brake beam..... C. Vanderbilt
 Brake handle..... H. W. Gibbs
 Brick and tile for walls, &c. Combined..... D. W. Anderson
 Bricks. Treatment of refractory..... S. Zuckschwerdt
 Brush and comb. Combination..... C. E. Flemming
 Cable rope equalizer..... W. H. Beebe
 Calculator..... E. W. Sibley
 Can dipping machine..... L. Harrington
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 Can opener..... M. E. Duncan
 Candy coating device..... P. Panoulas
 Canteen..... G. M. Spencer
 Car. Ballast spreading..... W. R. Scott
 Car coupling. Automatic..... A. A. Rosengren
 Car friction draw gear and buffing apparatus. Railway..... S. P. Bush
 Car heating system..... E. H. Gold
 Car underframe. Railway..... H. R. Keithley
 Carburetor..... W. F. Betzel
 Carburetor..... T. H. J. Leckband
 Carpet securer. Stair..... W. Kernochan
 Carriage. Folding baby..... A. G. Green
 Carriage top and curtain..... W. B. Giessler
 Carrying device..... J. Moeller
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 Cartridge shell base..... A. T. Duncan
 Cash registers. Locking device for the operating cranks of..... C. Laurick
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 Channeling machine..... A. B. Fowler
 Charging switch..... M. R. Hutchison
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 Checks, &c. Means for certifying..... J. S. Alexander
 Cheese. Manufacture for..... F. A. Hurd
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 Cigar bunching machine..... W. Weierbach et al
 Cigar bunching machine..... J. R. Williams
 Cigarette machine..... G. Ferrari
 Cigarette machine automatic stop mechanism..... G. Ferrari
 Cigarette machine tobacco measuring mechanism..... G. Ferrari
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 Circuit closing device..... A. B. Chance
 Clamp..... W. T. De Worth
 Clamp..... J. A. Smith
 Clasp or buckle..... J. Sulzbacher
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 Clutch mechanism..... G. Ferrari
 Clutch. Variable speed..... W. A. Wood
 Coal breaking machine..... L. de Bertier de Sauvigny
 Coatings. Machine for applying..... J. B. McKeown
 Coffee pot..... H. Nutrizio
 Coin controlled machine..... F. J. Hall et al
 Coke drawer..... D. Ferguson

Coke oven..... W. T. Gates
Collapsible box..... O. Feil
Collar for horses or the like..... J. Ahrendt
Collars, Drying..... R. Cluett
Comb. 2 pats..... A. B. Durgin
Comb..... W. Kronheim
Composition of matter..... J. Murphy
Conveyer, Endless..... W. L. McCabe
Conveyers, Driving mechanism for portable electric..... W. L. McCabe
Conveying apparatus..... J. W. Foreman
Cooler..... C. F. Conover
Copy holder..... J. C. Whitescarver
Copying cloth and frame, Letter press..... L. Biersach
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Cotton compress..... J. L. Denton
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Crate, Shipping..... E. E. Williams
Crupper..... G. Schneider
Cuff holder..... S. McCay
Curtains, Device for holding spring actuated..... J. H. Milans
Cut out, Automatic..... G. E. Andrews
Dental form for holding teeth..... R. J. Wenker
Depilating compound..... 2 pats..... H. S. Elinn
Depilating process..... H. S. Blinn
Depositor, Double stroke..... D. M. Holmes
Detachable handle for caskets, boxes, &c..... C. Young
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Duplicator..... A. H. Ferris et al
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Dynamo brush mechanism..... W. L. Bliss
Eaves trough hanger..... H. Pope
Edging device..... J. Rostochil
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Elastic material which cannot be readily punctured, Manufacture of sheets of flexible..... V. E. Belldin
Electric battery..... E. A. G. Sreet
Electric discharges, Rotary apparatus for the production of diffused..... M. Otto
Electric furnace, Oscillating..... P. L. T. Heroult
Electric switch or cut out..... J. A. Heany
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Electrotherapeutic battery..... T. J. Dunn
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Engine..... W. G. Cowan et al
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Engine lubricating apparatus..... E. T. McKaig
Engine stop motion, Steam..... O. Williams
Engines, Fuel or other reservoir for internal combustion..... C. O. Hedstrom
Engines, Water cooling and circulating apparatus for explosion..... E. Estcourt
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Evener, Four horse..... J. W. Sayre
Expandable stopper..... R. L. S. Doggett
Eyeglass guard..... J. F. Coombs
Eyeglass nosepiece..... C. F. Wall
Eyelet setting machine..... 2 pats..... F. A. Rumney
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Fastening device..... F. A. Fairbrother, Jr
Fastening device..... P. Kleber
Faucet and automatic graduate, Measuring..... G. J. Adams
Feed water heater..... G. Florack
Fence post, Metal..... C. C. Hagerman
Fencing, Woven wire..... A. W. Wellman
Filter..... F. Bommarius
Filtering apparatus..... C. Baechler
Firearm safety attachment..... J. F. Herndon
Fire escape..... S. B. Parker
Fire truck and ladder..... H. W. Lloyd
Fish, &c. Reducing or rendering..... E. R. Edson
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Flow reducing device..... J. W. Nethery
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Foundry pattern clamp..... E. J. Kiss
Fuel, Apparatus for combustion of..... C. Oisted
Fuel compound..... J. H. Ricker
Furnace..... C. F. Smith
Furnaces, Apparatus for supplying fuel to..... G. M. Warner
Furnaces, Reversing valve for regenerative or similar..... A. Fischer
Garment supporter..... S. C. Pearson
Garment supporter..... W. G. Walton et al
Garment supporter..... J. Sulzbacher
Gas and steam convertible engine..... reissue..... G. Dahlberg et al
Gas filter..... B. W. Harris
Gas generator, Acetylene..... S. L. Newlin et al
Gas, Manufacturing illuminating..... C. W. Isbell
Gasoline engine..... E. T. McKaig
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Governor adjuster, Centrifugal..... J. E. McIntosh et al
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Grate..... G. Maag
Grate and grate bar..... W. McClave
Grate, Roller..... J. MacCormack
Grinding machine..... J. Bath
Grinding machine, Twist drill..... C. A. Chandler
Gun cleaner..... G. H. Garrison
Hammer, Pneumatic..... C. H. Haeseler
Harness attachment..... N. Herbrand
Harrow, Sulky..... P. B. Christensen
Harvester, Grain..... H. P. Finley
Hat sweat band..... C. L. Johnson
Head covering..... A. Bouilly
Head or search light..... H. H. Taylor
Heater, radiator, or stove..... T. P. Keenan
Heating apparatus..... E. Gerrard
Hide securing apparatus..... H. Y. B. Duff
Hinge joint for seating..... F. S. Brooke
Hoisting apparatus..... E. H. Watlington
Hoisting engines, Derrick swinging attachment for..... A. Lambert
Hoof trimmer..... W. S. Casterlin
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Hydrocarbon burner vapor generating apparatus..... T. J. Forde
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Mill..... A. Thirion
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Mitering machine..... J. L. Tyler
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Packing ring..... H. Kirschning
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Parer, Apple..... J. Jacobs
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Piano extension pedal..... R. F. Lotspeich
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Pipe coupling, Automatic train..... W. G. Trethewey
Pipe ends, Machine for tapering corrugated..... J. H. Schlaflly
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Planter, Corn..... L. P. Graham
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Railway crossing and switch for same..... C. Leidecker
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Railway tie..... (reissue)..... W. C. Gregg
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Railways, Electrical safety alarm and signal mechanism for..... J. L. Ricketts
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Sash lock..... E. A. Patterson
Sawing machine, Circular..... H. J. Colburn
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Self healing material..... G. H. Chinnock
Separator..... G. M. Jackson
Shade hanger..... M. H. Boyce
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Sheet transferring mechanism..... G. F. Read
Shelving, Metallic..... W. H. Taylor
Shoe fastener..... J. F. Hawkes
Shoe lining trimmer..... C. B. Corwin
Shoe polishing machine..... M. Levy
Shovel attachment..... W. T. Spillane
Singletree attachment..... J. W. Magary
Slab or tile for building purposes..... N. Poulson
Slabs with plain or ornamental surfaces of plastic cement or composition, Machinery for making..... G. B. Hall
Smelting furnace..... 2 pats..... C. Laughlin
Smoke consuming apparatus for steam boiler or like furnaces..... R. D. Brett
Smoke consuming appliance for furnaces..... J. Alves
Sorting and addressing machine..... S. Elliott
Sound modifier..... N. C. Durand
Soup material and making same..... W. T. Scheele
Speed driving mechanism, Two..... F. L. Sanders
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Stovepipe cleaner..... B. C. Oblinger et al
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Sugar from its solutions, Extracting..... A. Wohl

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Target..... J. L. McCullough
Teaching gun practice, Apparatus for..... C. A. Sporrang
Telegraph, Page printing..... G. Musso
Telegraphic apparatus..... C. M. Davis
Telegraphy..... 3 pats..... A. C. Crehore
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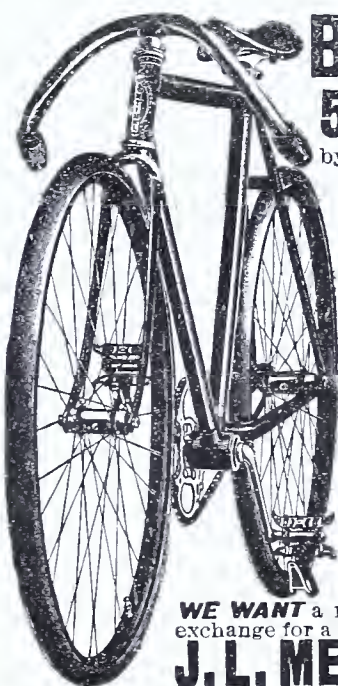
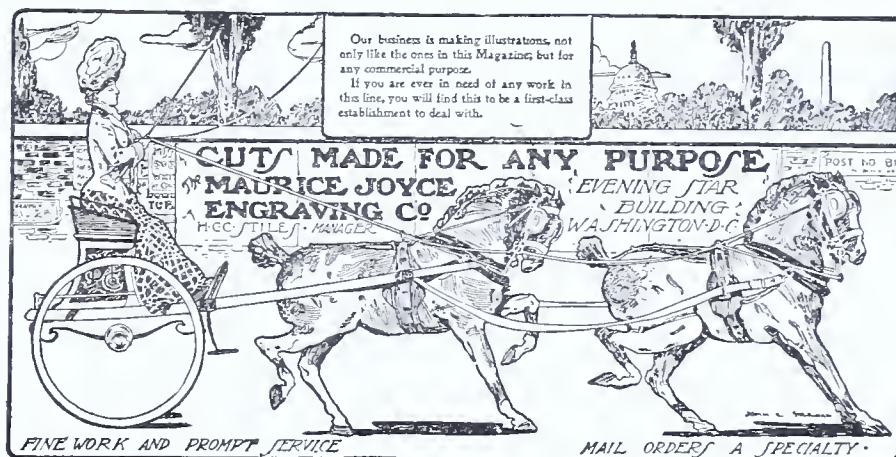
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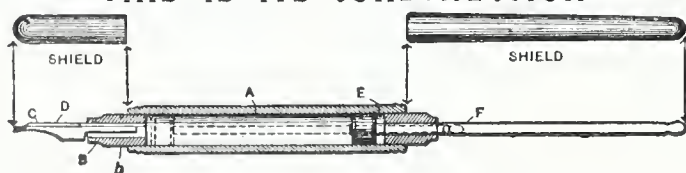


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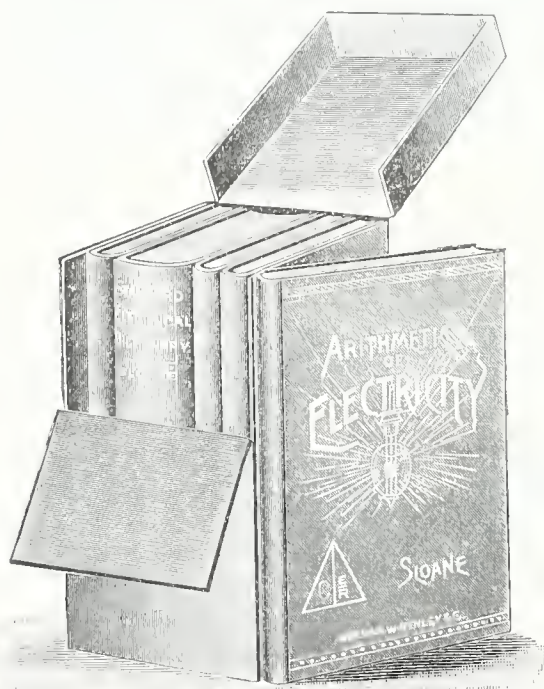
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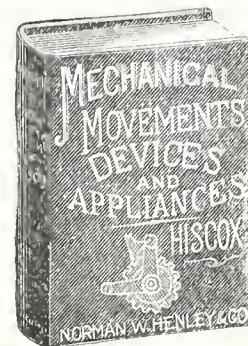
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THE Inventive Edge AND
PATENT INDEX.

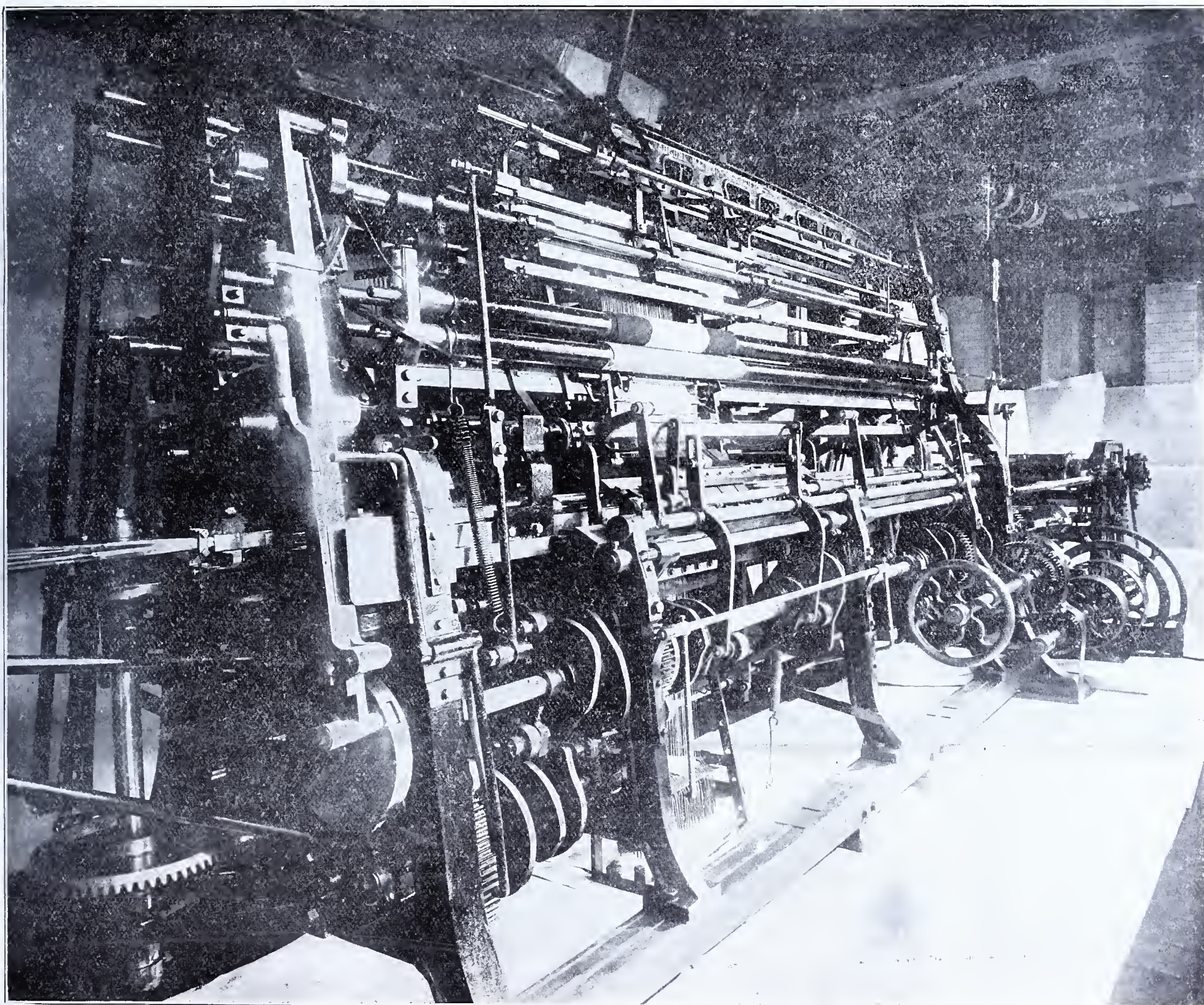
AND SCIENTIFIC PROGRESS.

Fourteenth Year. {
No. 10.

WASHINGTON, D. C.—OCTOBER, 1902.

} Single Copies 10 Cents.
} One Dollar a Year.

New Machine for Making Lace.



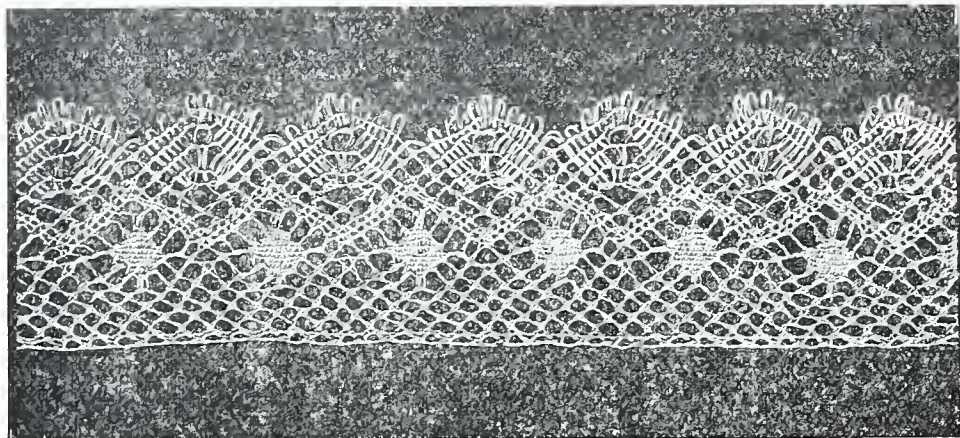
CONSIDERABLE interest and speculation have been aroused in lace circles of Nottingham by the private exhibition of the first working model of a new lace machine, the invention of Herr A. Matitsch, of Vienna. The machine, will, it is claimed, produces real lace, or lace so closely resembling handmade

products of the same patterns, as to be hardly distinguishable by experts.

Herr Matitsch studied in a technical school at Vienna, and entered—in 1867—the well-known lace factory of Ludwig Dambock, which operates about one hundred machines. From machine engineer he became technical

director and, later on, partner, superintending the building of new machines. As the firm also handled handmade laces, he became practically familiar with all branches of the trade, and conceived the idea of devising a machine which would produce a cheap but "real" torchon lace, suitable for washable trimmings. In 1882, he had a model constructed which produced a torchon lace, but it was a technical, rather than a practical, success. He continued the development of the idea, and, retiring from the firm in 1895, devoted his whole time to the subject. Coming to Nottingham, after completing a model in Vienna, he, after some effort, made arrangements with an experienced manufacturer to construct the machine. Herr Matitsch then returned to Austria and began the train-

not movable sideways, and, consequently, the bobbin threads run into the laces produced without crossing each other in the lengthwise direction of the lace, this being the reason that with bobbin threads alone, no lace purl can be produced with the Levers machine. In the Matitsch machine, bobbin threads can be led from one side of the stuff to the other, thus crossing one another underneath. The lace purls are produced with the bobbin threads alone, as well as the other constructive elements, just as in cushion lace making by hand, thus securing a real lace and not an imitation, as with the Levers machine. A further material difference is that the needles which holds the completed thread crossing are not separated into two ranges with one movement, but



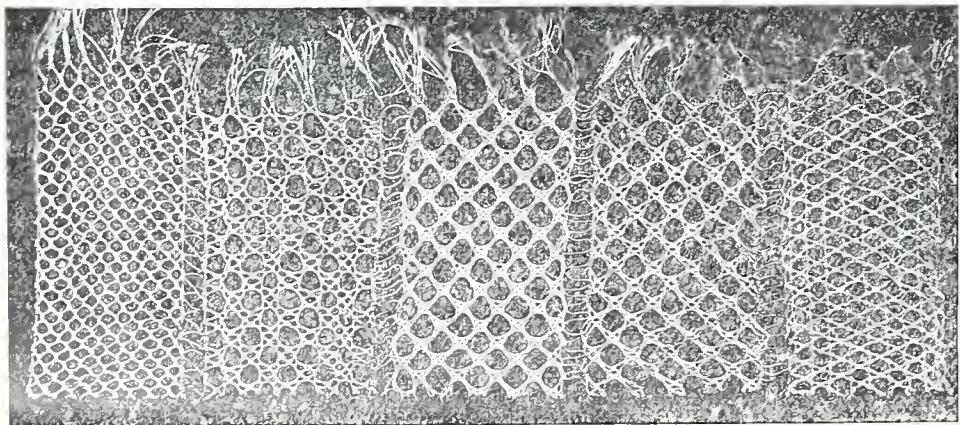
PHOTOGRAPH No. 2.

ing of three textile designers, in order to have proper jacquards ready upon completion of the apparatus. In June, 1899, this was roughly capable of working; the designers were brought to Nottingham, and three years of patient development followed. An illustration of the machine as it stands to-day in working order, representing already an investment of \$97,000, gives only a general idea.

The inventor's description of his machine is as follows:

It is based both upon the bobbinet and the English twist-lace machine,

each needle is completely independent and can be placed at any time into any one of twenty different holes and kept there as long as desired; while with the Levers machine, one range of needles has to be alternately taken out of the goods after the carriages go over, so that, after the draw out, they can be brought back to the same position which they occupied before, the necessity thus arising for putting the threads in rows and for a permanent and uniform winding of the completed thread web or lace. In the Matitsch machine, no necessity exists for work-



PHOTOGRAPH No. 3.

utilizing both principles, and can produce any number of breadths up to the length of the machine, the working model having a length of only 100 inches, whereas 200 inches are feasible. It thus vitally differs from all present single-breadth machines producing a similar lace. It also differs in that every carriage and every needle can be moved independently, and any carriage can not only be kept back in the combs, but can also be moved the length of the machine, right or left, according to convenience. In the Levers machines, all the carriages have to be moved simultaneously from one line of combs to the other and are

ing in rows in making the lace purls, but this can be done at will, just as in cushion-lace making. The winding can be done at convenient times and in convenient lengths.

Samples of several lace patterns made upon this new machine are shown in the above illustrations.

Photograph No. 2 shows what is called a fan torchon (Facher torchon), a lace which can only be made with retrograde threads running upwards on the goods, which up to now has not been produced by any machine.

The patterns shown in No. 3 contain in their construction several different lace grounds—Mechlin, Brabant,

Idria, and Chantilly—with webs of two and four threads and worked side by side, demonstrating that special machines are not necessary to produce different laces, but that they can be simultaneously produced upon this machine by the use of the proper jacquard cards.

The photographs disclose obvious imperfections in the samples, and it is equally obvious that the samples are of coarse texture. The defects, the inventor states, arise from the difficulties of tension, etc., which any expert will understand in working the narrow breadth of 15 inches upon a machine calculated to work 109 inches or more. The narrow breadth is being worked for exhibition purposes solely upon the ground of economy, it being evident that if the machine can work the patterns shown, it can also work to its full length. The coarseness of the sample product was also intentional, a coarse gauge being adopted in order to secure mechanical ease in the construction, alteration, and perfection of parts. For similar reasons, the present machine is geared to work only 60 motions per minute, while 100 motions are within mechanical possibility.

STORING GRAIN IN MANCHURIA.

Manchuria is one of the most interesting sections of the world at present, both on account of the diplomatic struggle between Russia and other nations, which may or may not result in keeping the door open to foreign trade, and because so little is known about the land and the people. The country is said to be one of the richest sections in the Chinese Empire,

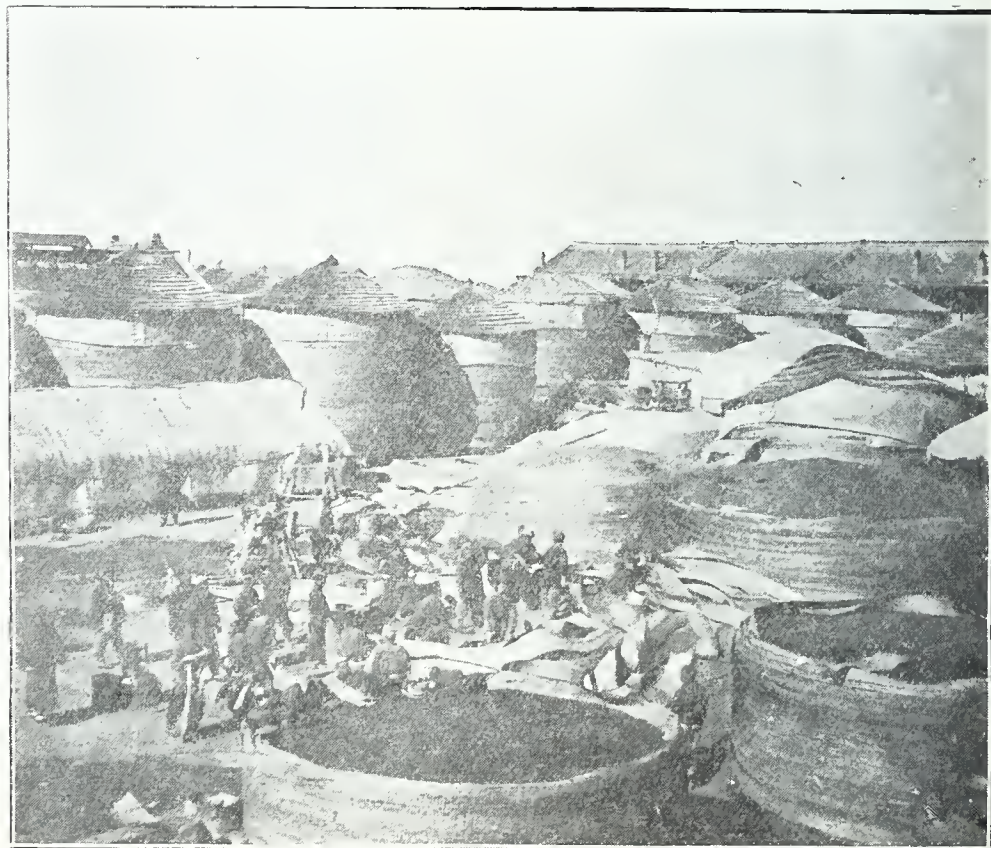
Sterilizing Water by Ozone.

A new process for sterilizing water, by the use of ozone, has resulted from experiments that have been carried on for some years by the well known Berlin firm of Siemens and Halske. The method is described as follows:

The water to be purified is pumped to the top of a high tower and allowed to drop gradually through layers of coarse gravel: the idea being to separate the dropping water as much as possible. At the same time, air impregnated with ozone is forced in from below, and it rises through the many openings left between the filters, and thus comes into close contact with the water. The air is thoroughly mingled with the water, and kills all injurious germs contained therein. The sterilized water finds its exit at the bottom of the tower, so that the process can be continued without interruption. By enlarging the tower, or by the establishment of several towers of the above description, the quantity of purified water can be enlarged at will. The experiments were made on the water of the river Spree, which is full of impurities; but it was found that after it had passed through the process described, it was pure and fit to drink. Before being conducted into the tower, the water is quickly passed through a coarse filter, so as to first clean it from the grossest impurities. The experimental works produce enough water to supply the wants of a town of 5,000 inhabitants.

tion as the Columbia River basin, in the United States. In winter, it freezes to a depth of several feet, but this thaws out in April, and the ground is as easily cultivated as a bed of ashes. Famines are unknown here.

On account of the primitive appliances for cultivating and storing grain, however, it will be many years before we will lose this market. The



and the people are remarkable for their thrift. It is predicted that when this district is developed, it will no longer offer a market for many products that we now send to China: our wheat, for instance, will be debarred because of the native output. The soil of Manchuria is of a sedimentary formation, many feet in depth, and very productive; it is said to contain the same elements for wheat produc-

plows are crude and heavy, sometimes needing 6 mules to pull one. Harvesting and thrashing are done by hand, and the method of storing wheat is so novel that we give an illustration. Matting 18 inches wide, made of reeds, is wound about from long rolls as the grain is poured in, forming a circular bin, and the top is then covered with a straw matting. The picture shows not only the completed bins, but several in process of construction.

The Berlin Electric Elevated and Underground Railway.

AFTER five and a half years of labor in construction, the Berlin elevated and underground electric railway has been opened for traffic in the presence of the Imperial Minister of Public Works and a large concourse of distinguished persons. The new

should be subterranean in the densely built central portions of the city, and elevated in the southern and western precincts, where space and other conditions favored such construction. The franchise was granted March 22, 1893, for a term of ninety-nine years, and

pleted April 27, 1897, when the Deutsche Bank became the financial backer of the corporation. Its capital is 25,000,000 marks (\$3,950,000), one-half of which is represented by 4 per cent bonds, the other half being ordinary stock shares. This company entered into a contract with Messrs. Siemens & Halske, owners of the franchise, by which the corporation acquires all rights and privileges previously granted to the firm.

In the general plan, equipment, and application of electrical power to the

can not study too soon or too thoroughly, is in the artistic beauty, the architectural charm and sense of fitness which they have imparted to the stations, the bridges, and even the ordinary overhead viaduct sections of the new road. Elevated railways in America are admittedly efficient and well managed: they run spacious, well-ventilated, comfortable cars at high speed for fares which are very low in comparison with carriages and other means of transportation. But they are for the most part plain and commonplace in appearance, and the stations, even in central and populous precincts, are often sheds which are considered blemishes to the neighborhood. Here, the requirements of public taste are never permitted to be neglected or forgotten. Where the new Berlin line passes through a public square, it is on solid and artistically designed masonry. The above-ground stations are of stone, steel, and glass, no two alike, but each specially designed to fit not only the requirements of traffic at that point but the adjacent buildings as well—the architectural framework in which it is set. Where, for instance, shall we look outside of continental Europe for interurban railway stations like those at the Schlesisches Thor and the Nollendorf platz or a bridge like the Oberbaumbrücke, on which this new Berlin line crosses the Spree?

The whole management of the enterprise, from start to finish, illustrates the wise, firm control which the municipality of Berlin maintains over corporations which ask for franchises at its hands. As one example among many others of the result of such control, the western branch of the new line from Nollendorf platz to Charlottenburg passes through a series of broad, handsome boulevards in the new and choicest residence portion of the city. There was abundant room for a viaduct along the broad central esplanade between the driveways, and to have built it as such would have saved millions of marks. But the overhead construction, however artistically designed, and the roar and rush of trains would have defaced such



THE ELECTRIC ELEVATED RAILWAY.

line forms so important an addition to the intramural transit equipment of the German capital, and includes in its construction certain features so novel and attractive from a technical standpoint, that some account of the inception and fulfilment of this enterprise may be of interest, as an example of German municipal methods in dealing with transit corporations.

Those familiar with the Berlin of today know that it possesses, besides a comprehensive and excellent system of electrical surface tramways, an elevated steam railway in two loops, which traverse the city in the form of an elongated figure 8, and a so-called "Ringbahn" or belt line of electrical surface roads on which cars make the circuit at frequent intervals and in opposite directions. But as long ago as 1892, it became apparent that all these were inadequate to handle the steadily growing traffic of the central portion of the city. Many of the principal streets in the older districts are narrow; many which were laid out centuries ago to fit the meanderings of the river, are crooked; and at many points where these crowded thoroughfares converge, cars and omnibuses pass continuously and travel becomes so congested at certain hours that some new means of relief became imperative. Accordingly, Messrs. Siemens & Halske, the eminent electrical manufacturers and constructors, petitioned for a franchise to build and operate an electrical railway which

included several rather exacting provisions. Under it, contracts were made with the municipality of Berlin, July 18, 1895, and subsequently with the suburban cities of Schoeneberg

working of this new line, little is presented which can be regarded as novel or especially suggestive to anyone familiar with the present condition of electrical elevated and underground



THE BRIDGE OVER THE SPREE.

and Charlottenburg, through which the projected line was to pass. Actual work was begun with imposing ceremonies on September 10, 1896. The organization of the company was com-

city railways in the United States. The one respect in which the German constructors leave their American colleagues far behind, and offer an object lesson which our countrymen

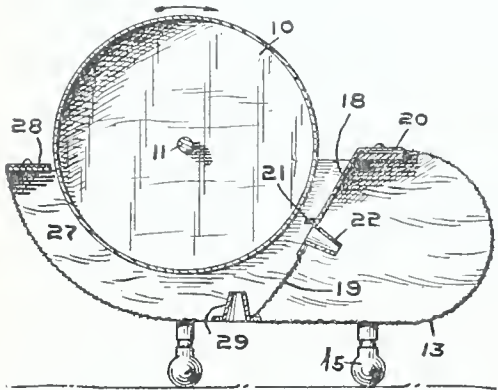
a neighborhood, so the company was compelled to lower the grade from Nollendorf platz westward, underrun the boulevard, and keep out of sight and hearing thenceforward until the ultimate terminus at Charlottenburg

CLEVER NEW PATENTS.

y Trap.—Heating Stove.—Stilt.—
Hook and Eye.

Fly Trap.

The Household Manufacturing Company, of Indianapolis, Ind. has obtained control of a patent recently granted on an entirely novel idea in fly-traps, which Mr. Henry A. Bierley, of the same city, evolved. It consists of a cylinder 10, mounted horizontally in a stationary casing below and which supports the cylinder. The cylinder is carried on the rod 11, that has bearings in the ends of the casing. The ends are made, preferably, of wood, and the sides and bottom of the casing are made of wire-netting 13. The cylinder is rotated in the direction indicated by the arrow by any suitable means, as a spring motor regulated by a clockwork mechanism forming a part thereof. There are two chambers



in the casing—the outer or cylinder chamber 27, in which the cylinder rotates, and the inner chamber for holding the flies coming from the outer chamber. These chambers in the casing are separated by a partition, the upper part of which is formed of a metal plate 18 and the lower part of wire-netting 19. The plate 18 is inclined downwardly somewhat toward the cylinder, and has a guard-plate 21, that extends toward the cylinder, so as to prevent the flies from escaping from the chamber 27 in which the cylinder is mounted, but is spaced far enough from the cylinder to permit flies on the cylinder to pass it. Immediately below said guard-plate 21, there is a series of large openings leading from the outer chamber 27 to the inner chamber 17 through solid conical tubes 22, and through which flies may readily pass into said inner chamber. The outer surface of the plate 18 is made bright and the inner surface dark, and the conical tubes 22 being contracted at their inner ends, the flies will not escape.

The chamber 27, in which the cylinder is mounted, is closed to hold the flies on one side by the guard-plate 21 and on the other side by the guard-plate 28, that approaches the cylinder very closely. Flies may enter the antechamber independently of the cylinder through a series of openings formed in the bottom by the conical tubes 29. A door 30 is made in the end of the casing to give access to the chamber 17, for cleaning or for any other purposes.

In use, the device is placed near a window. Syrup or other suitable bait is placed on the cylinder in the grooves 31. When the motor is wound

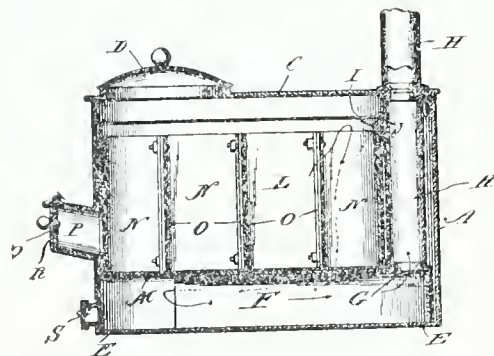
up, the cylinder will rotate in the direction indicated by the arrow, and will carry the flies that alight upon the cylinder into the chamber 27. After the fly enters the chamber 27, he cannot escape, as the guard-plate 28 will prevent him from following the cylinder. If the fly goes in the other direction to the right, he will climb the wire-netting 19, until he reaches the guard-plate 21, whereupon he will move to the left and enter a conical tube 22, because its inner end faces the light.

Heating Stove.

An ingenious heating stove for burning wood, hay, or straw has been patented by Mr. Charles Matthews, of Columbia, Mo., a sectional view of which is herewith illustrated. *A* indicates the outer shell or body portion of the stove, which is formed of sheet metal and provided with a removable top *C*, having located near one end thereof a feed-opening *D*. The body portion or shell is closed at its bottom.

Within the body portion *A*, resting on the bottom *E* and secured thereto is arranged a box-like compartment *F*, open at its forward end. The rear end of the compartment *F* is closed, but in the top surface thereof is provided an opening *G*, having an annular flange adapted to enter the lower end of a smoke-flue *H*. At the latter is provided a damper *I*, which may be worked by a rod *J* projecting horizontally through the shell of the stove. The flue *H* extends up to the top *C* and around a collar on the lower side thereof. On the upper side of the top, a similar collar is provided for supporting a length of pipe, which through a suitable opening in the top communicates with the flue *H*.

The fire-box is formed of a lining *L* and a bottom *M*, both of which are removable. The lining *L* and the bottom *M* may be made of sheet or cast metal. The lining *L* is formed of sections *N*, having intumed flanges *O* secured together by bolts or rivets.

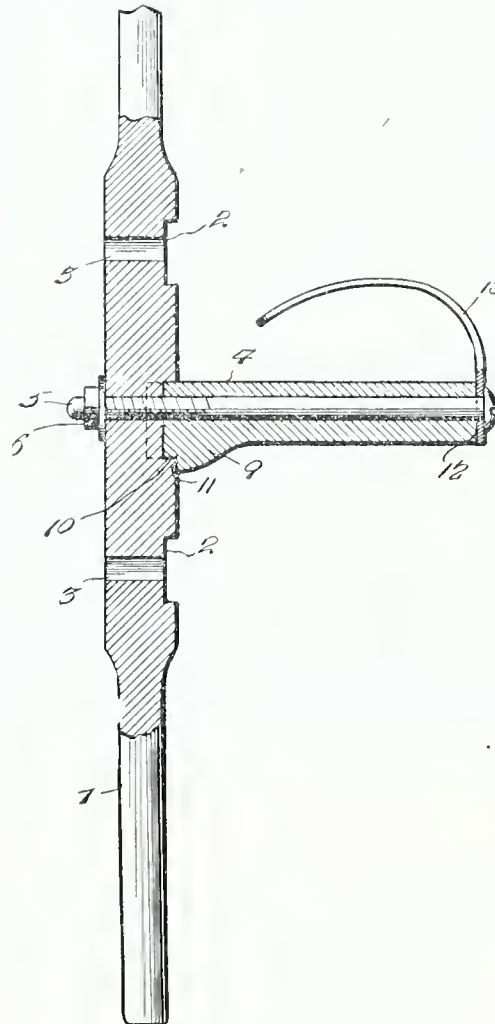


It will be noticed that the lining *L* and the inner bottom *M* do not extend the full length of the body portion of the above. They extend from the front wall back to the smoke flue *H*. With such construction of the parts a passageway is formed on both sides of the flue *H*, and each of these passageways connects with a passageway, extending along the bottom *E* on both sides of the compartment *F*. The forward or open end of the compartment *F* being located near the front of the stove, it is apparent that the products of combustion will pass up over the rear wall of the lining *L*, and down the passage-ways on both sides of the flue *H*, and along the bottom of the stove to the front or open end of the compart-

ment *F*, and thence rearwardly through said compartment to and out through the flue *H*. In the front wall of the body portion or shell is arranged a short section of pipe *P*, which registers with a suitable opening in the lining *L*, affording draft for the fire. The outer end of the pipe *P* is closed by a hinged door *Q*, having in it a small opening *R*, the latter to support combustion in a slow fire.

Stilt.

Young America will be delighted to hear of a new stilt recently patented by Mr. Dennison McDonough, of Eau Claire, Wisconsin, which can be adjusted to different heights, and is so constructed that it will not readily break.



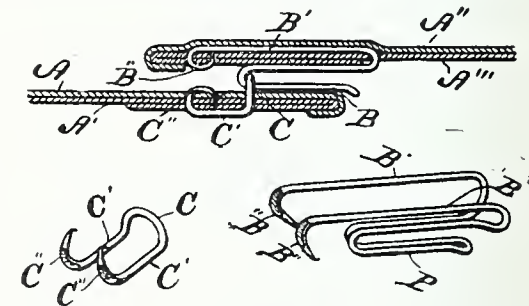
In carrying out the invention the lower portion of the standard 1, is made preferably rectangular, and provided with a vertical series of transverse recesses or seats 2, with openings 3, formed through the backs of the seats and the standard, and located between the ends of the recesses. The step 4, has its inner end shaped to fit the respective notches or seats, and is also provided with a bolt 5, passed centrally through the step, with its projected screw-threaded end located at the inner end of the step and passed through the adjacent opening in the standard, there being a nut 6, applied to the projected end of the bolt, so as to draw the step snugly into the seat. The inner end of the step is provided with opposite vertical flanges to snugly embrace the standard by bearing against the opposite side surfaces thereof, and the other side of the step is downwardly enlarged, as shown at 9, and transversely notched to form a transverse shoulder 10, which rests upon the lower wall of the seat in the standard to form a strong and durable connection between the step and standard, and prevent the twisting of the former with relation to the latter. In other words, the standard is transversely recessed or notched to form the step-seats 2, and the inner end of the step

is vertically recessed to receive the standard, the portion of the the step adjacent to the recess therein being fitted in a transverse recess or seat of the standard and having a vertical bearing-shoulder 11 for contact with the face of the standard below the recess 2. This forms an efficient interlocking joint between the parts, and when the bolt is tightened it secures the parts against looseness and at the same time affords transverse strength to the step.

At the outer end of the step is a vertical groove or recess forming a seat 12, in which is fitted one end of the toe-clip 13, which curves inward and downward over the step and is of sufficiently resilient quality to adapt it to yield when the foot of the operator is inserted thereunder. The seated end of the toe-clip is provided with an opening for the reception of the bolt 5, of which the head bears against the outer surface of said clip, and therefore the same bolt serves to secure the clip in place and fastens the step at the desired adjustment upon the standard

Hook and Eye.

The latest improvement in hooks and eyes has been patented by Mr. Milton E. Campy, of Hamilton, Michigan, and Mr. Horace B. Peck, of Kalamazoo, Michigan, has purchased a half interest in the patent. Referring to lettered cut, *A''* is the upper flap of a garment, and *A* is the under flap. These are illustrated with the usual linings. The eye is formed of the central engaging portion *C*, which is upset a little from the body portion. The body portion is made up of short parallel wires *C'* *C'*, terminating in upwardly projecting sharp-pointed hooks, the points being slightly turned in. This eye is applied by inserting the pointed hooks through the flap *A*, turning then backward from the edge of the same, and then inserting them again through the flap, when the points are clenched down. The backs of the hook portions are flattened at *C''* *C''*,



so that they bend readily at that point and close down tightly upon the fabric, and do not cause any projection. The hook is formed in the usual way, with the exception that the loops are omitted, and the wires extend parallel with the shank of the hook *B' B'*, and terminate in downwardly-curved sharp pointed hooks. These hook portions are also flattened at *B'' B''*, similar to the attaching-hooks of the eye and for the same purpose. The garment-hook is attached by inserting the attaching-hooks thereof through the lining of the garment at a considerable distance from the edge, then passing the extended portion *B'*, backwardly toward the edge, and inserting it down through the lining close to the edge, when the attaching-hooks are clenched the same as the attaching-hooks of the eye. It will thus be seen that the strain of the hook is borne by a wide band of the material, and that the strain comes principally at the edge of the garment which is retained over and entirely conceals the hook. This hook and eye being so firmly secured to the garment greatly relieves the strain upon it and makes it very easy to fasten and unfasten.

THE UTILIZATION OF WASTES AND BY-PRODUCTS IN MANUFACTURES.

WITH SPECIAL REFERENCE TO THE DECADE OF 1890-1900.

By HENRY G. KITTREDGE, of the Census Bureau.

PART II.

IRON AND STEEL INDUSTRY.

The economic uses of furnace slag have been greatly developed within the last few years. Formerly this slag was carted away from the furnace and disposed of in the most available place, as so much refuse material, hardly worth the cost of carting. It was considered an incumbrance of the smelting works, of no account except to fill up gullies and ravines, or to be thrown into the sea, if such a disposition could be made of it. Within very recent years it was estimated that the cost of removing this waste slag from the furnaces of England was no less than \$2,500,000 annually. The amount of slag made by the iron furnaces of Great Britain is certainly immense. A considerable portion of this waste is now put to some profitable use as a substitute for artificial porphyry in the construction of buildings and for street pavements. Paving stones are made from it for the streets of Metz, Brussels, and Paris, of a quality sufficiently durable to stand heavy traffic. Mr. T. Egleston, in a paper read in 1872 before the American Institute of Mining Engineers, on the uses of blast-furnace slag, described a process by which, at a small cost, good bricks may be made of it, and a cement equal to the best Portland cement.

In an article contributed by F. Luermann to the Engineering and Mining Journal, in 1898, it is stated that bricks manufactured from granulated blast-furnace slag are preferable, as building material for dwelling houses, to those made directly from fluid slag, since the former are porous, while the latter, being impermeable to air and steam, would cause the aqueous vapor exhaled by the occupants to condense on cold days, and thus render rooms damp and unhealthy. Good bricks may be produced from granulated slag mixed with dust from slag which has crumbled in the air, but the hardening process is rather slow. It is stated that slag brick is quite as strong as ordinary brick, while it may be heated, without injury to its strength, to a temperature at which carbonate of lime begins to decompose. Slag brick appears to be particularly adapted to the construction of chimneys, for lining limekilns, and for boiler setting. The manufacture of slag brick is carried on in Russia, and it is stated that the brick made there possesses strong hydraulic properties capable of withstanding high and low temperatures, weighs less than stone, and requires less mortar when laid. Its tensile strength is about 312 pounds; its crushing strength, 1,250 to 5,600 pounds per square inch, according to the time of hardening.

At the Karl-Emil Hutte, in Koniginhof (Bohemia), bricks are said to be made from the cinder produced in a coke furnace smelting an oolitic impure clay ironstone. The slag is run from the cinder notch into water, where it is granulated to a gray-colored sand. It is then mixed in a mill with milk of lime and pressed into bricks, which must be left for eight days to harden before they will bear transporting. The bricks are made to stand a pressure of 256 pounds per square inch, though they are guaranteed only to carry two-thirds of this amount. The whole width of the brick should withstand a load of 5 tons.

In a paper read very recently by Edwin C. Eckel, before the American Society of Civil Engineers, on slag-cement manufacture in Alabama, it was said:

"American technical literature contains little upon the subject of slag cements. This is the more curious as the matter would seem to be of considerable importance to engineers. For whatever the value of slag cement may be as a structural material, the industry has become fairly well established in this country, at least six factories being at present in operation, and I believe that all the plants are in a comparatively prosperous condition. The materials used in the manufacture of slag cement are blast-furnace slag and slaked lime. Two slag-cement plants are now in operation in Alabama, both being located in the vicinity of Birmingham, in close proximity to large supplies of both lime and slag of proper composition."

Slag-cement works have been established in a number of European countries, but probably the greatest development has been reached in Germany. It was stated in a communication to the Architectural Association of Berlin, in 1892, that there were then in that country ten slag-cement factories, with an annual production of 600 tons. About this time the Maryland Steel Company intrusted R. W. Mahon with an investigation of the slag from their blast furnaces to determine its value for cement making, and laboratory experiments were made which became the subject of a paper that was read before the chemical section of the Franklin Institute, in 1893. The result of these experiments was to answer the question affirmatively whether it was possible to make from slag a cement. The slag used was the refuse of Mediterranean ores and an ore mined in the island of Cuba. The limestone came from a point near the city of Baltimore.

It has been found that an admixture of prepared slag with cement adds to its tensile strength in the end, but is apt to have the effect of slightly lowering the initial strength of the cement: i. e., the resistance to tension and compression which the cement acquires within, say, from one to seven days. This defect, however, says A. D. Elbers in the Engineering and Mining Journal of 1897, can be overcome by treating the prepared slag with an aqueous solution of sodium carbonate, rendering it so efficient that a suitable admixture of it with Portland cement is apt to raise the tensile strength of the latter from 50 to 100 pounds per square inch.

Thomas or basic slag is now used by fertilizer manufacturers in large quantities instead of imported phosphate rock, especially in Germany, where the total consumption of basic slag in 1896 was estimated at 800,000 tons. During the same year there were 83,765 tons of this slag imported into Germany, while the exports, chiefly to Belgium, were 134,257 tons.

Reference is made in the Journal of the Society of Chemical Industry, 1897, to the recovery of tin from spent tin baths by the treatment of the oxide of tin with hydrochloric acid in the presence of metallic tin. The process is also utilized for the recovery of tin from the waste liquors of the dyehouse containing tin in solution. From such waste solutions the tin is precipitated by means of lime, sodium carbonate, sulphuric acid, sodium sulphate, etc. The oxides are digested in concentrated hydrochloric acid. As long ago as 1861, Messrs. Edward and Charles Kuhn, chemists of Sechsbau, near Vienna, took out a patent for producing pure tin, good weldable iron, ammoniac, prussian blue, and some minor

products from the waste clippings of white iron. A firm at Manchester, England, utilizes the tin from waste tinned iron (scrap tin) in the manufacture of stannate of sodium.

A very important innovation in the metallurgical industry in Germany is the utilizing of the waste gases of blast furnaces for working gas engines. That the waste gases can now be made serviceable in their entire heating capacity by a rational burning in gas engines, is one of the most important steps that have been recently made in science in its adaptations to practical technics. What this improvement means, economically, is seen by a theoretic calculation according to which this use yields a profit of \$1.25 per ton of pig-iron production, which means for Germany alone, where the utilization of these waste gases is made, a gain of over \$10,000,000 on her entire wrought-iron production.

Gas machines for utilizing these gases were introduced into Germany about 1898. Good results were reported from all quarters, which lead to the belief that this is a material advance in the development of an important gas-machine industry. So confident are those who are interested in it, that blast furnace gas engines of large dimensions have already been erected at different places in that country. An establishment at Donnersmarck may be particularly mentioned as having erected a gas dynamo of 600 horsepower. The managers calculated that if the quantity of gases which hitherto, when burning under boilers, produced 1,000 horsepower in round figures, be used for burning in gas-power machines, the production would be increased to about 2,700 horsepower.

To utilize these gas engines to their greatest advantage it has been thought that electricity would have to be employed. The electric transmission of power acts as an auxiliary, which is regarded as an incalculable advantage, notwithstanding the loss of about 20 per cent in energy. The Cockerill Company, of Seraing, Belgium, with the cooperation of Mr. E. Delamare-Deboutteville, is said to be first to solve successfully the problem of the direct utilization of blast-furnace gases as a source of energy. Since 1895 a gas engine of this kind has been in operation at the works of this company, and their 600-horsepower single-cylinder gas engine exhibited at the Paris Exposition of 1900 attracted a great deal of attention from those interested

in the metallurgical industry.

In 1899-1900 there were imported and entered for consumption into the United States, for remanufacture only, 26,307.46 tons foreign waste and refuse, scrap iron and steel.

Manufacture of Sulphuric Acid.

The manufacture of sulphuric acid is perhaps the most important branch of the entire chemical industry. Lord Beaconsfield once said that the manufacture of sulphuric acid constitutes the measure of the industrial prosperity of a nation. There is hardly a chemical product in whose manufacture sulphuric acid is not required in some form or other, directly or indirectly. Without it, there would be no artificial manure, no aniline colors, no explosives: most of the organic and inorganic acids, artificial remedies, artificial odors, etc., etc., would not exist.

Sulphuric acid, as is well known, is a combination of sulphurous acid and oxygen; the sulphurous acid is produced by roasting pyritic ores: the oxygen is taken from the air. This combination or oxydization, however, is not effected immediately—a contact substance is required. In the process heretofore employed, nitric acid was used as this substance, and as an additional agent, water vapor. For this purpose immense lead chambers are necessary, whose construction and maintenance is costly: and as furthermore the sulphuric acid obtained is a diluted one, platinum retorts have been used for concentrating the acid: and platinum, as everyone knows, is a very expensive metal. Efforts have been made to find a contact substance which would require no vapor, and platinum asbestos is now being employed with success. The gases, sulphurous acid and oxygen, it is found, combine without high pressure, and at a relatively low temperature. The product can be supplied in any degree of concentration.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Siggers, Patent Lawyer, Washington, D. C.

William Bauer, Loyal, Wisconsin. Windmill.—This device embodies a hollow rotatable shaft having a cup-shaped hub, in which the shiftable sails are journaled, the inner ends of the journals being provided with crank arms. Within the shaft is a shiftable trip-rod, which is provided at one end with a detachable head entering the hub and having bayonet slots for the reception of pins carried by the crank arms of the sails, so that by shifting the trip rod, the sails may be thrown into and out of gear, and the operation of the mill stopped.

James C. Walker, Waco, Texas. Motor and Generator, two patents.—Mr. Walker, who is a prominent and experienced inventor, has recently obtained two patents, one for a novel motor, and the other for a steam generator. These devices, constituting a complete power plant, are designed with special reference to the propulsion of automobiles and other light vehicles, which necessitate the employment of propelling mechanism of great power and compact form. Mr. Walker's motor is of that type illustrated in his former patents, Nos. 515,631 and 611,555, but involves many improvements which render its operation more effective. It embodies positively operating and exceedingly simple controlling devices for automatically opening and closing the abutments and throttle valves of a series of rotary motor units, so that a series of pistons operating a single engine shaft are successively subjected to the propulsive energy developed by the direct impact of steam. The motor also includes novel cut-off mechanism whereby the period of steam-intake may be increased or diminished, in order to secure predetermined movements of the pistons under the expansive force of the motive agent. Another important feature of Mr. Walker's latest motor is the employment of manually operated controlling valves, separate from and independent of the automatically controlled valves, and designed to be set by the operator or engineer for the purpose of determining the maximum dimensions of the induction openings, and thereby limiting the extent of steam induction, which may be effected by the automatic operation of the governing mechanism.

The generator is of the flash type, and its capacity is truly marvelous when the size of the generating plant is considered. Within a suitable casing are mounted a pair of water tanks and a generating chamber, the inner wall of which is heated by vapor burners. The generating chamber is supplied with hot water or low pressure steam from the water chambers, the steam passing thence to superheaters which completely dry it prior to its delivery to the motor. The burners for the super-heaters supply hot products of combustion, to coils located within the steam space of the generator and also within the water chambers, so that these burners not only super-heat the steam, but also serve to heat the steam space and to raise the temperature of the water prior to the delivery of the latter in the form of a spray against the hot inner wall or flash-plate of the generating chamber. By an exceedingly novel arrangement of controlling devices, the supply of water to the generator and of oil to the burners is automatically regulated by the pressure of steam, so that the steam pressure will remain constant notwithstanding the fluctuating demands on the motor, which latter, in the pre-

ferred embodiment of the invention, is mounted directly upon the generator casing and serves to operate a series of pumps for maintaining a proper circulation of water and oil. It is believed by many experts that steam is the most effective and available motive power for automobiles and similar vehicles, and it would certainly appear that Mr. Walker's latest inventions mark a distinct advance toward the production of the ideal locomobile.

Maddra J. Hewlett, Kewanee, Illinois. Rotary Engine.—The translating device or engine invented by Mr. Hewlett and protected by the recent patent issued to him, eliminates the greatest, and perhaps the only vital, objection to motors of the rotary type. It is well understood by those skilled in the art that the efficiency of a rotating piston is vastly diminished by reason of the side pressure, that is to say, that pressure which is exerted toward the axis of rotation from the periphery of the rotating body and which produces the objectionable friction so noticeable in this type of devices. It is this objectionable characteristic which makes it necessary to turn over or start a rotary engine manually before subjecting it to its load. The problem of accurately balancing one or a series of rotary pistons has been solved by Mr. Hewlett, and the solution is so simple as to excite wonder that it has not occurred to others engaged in the development of rotary motors.

Within a suitable casing is mounted one or more rotary pistons provided with radial abutments for the impact of the steam or other motive agent. Instead of forming the pistons in the usual manner they are constructed with hubs and rims to produce a hollow formation. From the opposite walls of the casing steam chests or chambers extend into the opposite ends of these pistons and are closed at one side by the peripheral wall or rim of a piston. These chambers are located in apposition to that point of the piston which is subjected to the pressure of the steam or other fluid, which latter is led into the chambers and exerts a counter-pressure outwardly against the piston rim to resist the inward pressure exerted upon the periphery of the piston.

The result is the complete balancing of the piston and the total elimination of that side pressure so conspicuously objectionable in rotary engines. Mr. Hewlett's engine embodies a number of novel features in addition to that described, and is theoretically the most effective engine of this type with which the writer is familiar.

Alfred M. Hewlett, of Kewanee, Ill., is the owner of one-half interest in the patent.

John F. Murphy, Adrian, Michigan. Dress Shield Holder. Two patents.—Mr. Murphy has obtained two patents on dress shield holders, the first of which embodies pivotally connected arcuate members, which are provided at their pivotal connections with clamp members, designed to grip the arm-scyne of a dress waist, so as to maintain the device in proper position. It will be understood that the holder is fitted within the bight portion of an ordinary dress shield, and is secured thereto by stitches passed through openings in the holder. This patent has been assigned to Messrs George B. M. Scager and Herbert R. Clark, both of Adrian, Michigan.

The other dress shield holder consists of a flexible arcuate wire to be fitted in the bight of an ordinary dress shield, and secured thereto by stitches passed through terminal eyes on the wire. At the middle of the arcuate wire, and projecting at the convex side thereof, is a spring clamp to engage the arm-scyne to fasten the holder in place. To render the device more flexible, the wire may be twisted into helical spring members at opposite sides of the clamp.

Gideon L. Kimberly, Moundsville, West Virginia. Railway Track Fastener.—This device embodies a cross-tie having a dove-tailed groove in its upper face, and a pair of openings formed through the back of the groove near each end of the tie. Between each pair of openings is a pair of rail gripping members, which have their inner sides undercut to receive the flanges of the rail, and are provided with beveled or wedge-shaped extensions which overlap one another. One of the members has a projection to fit in one of the openings, and a pin or spike is set into the other opening and bears against the other member, so as to force the same toward the stationary member and thereby have a wedging action thereon.

Dr. Ananias D. Miller, of Mt. Pleasant, Pa., has secured broad patents for a new fluxing and separating compound and a novel process involving its use. This compound is designed for use in the treatment of copper, lead, silver, gold, and other ores to promote the fusion thereof, and insure the separation and concentration of the metal from the various substances with which it is associated in the ore or matte. The compound not only provides for the separation of the metal, silica, sulfids, and other substances, but also effects the separation of the pure metal from the matte itself, thus accomplishing a separation of the metal in one operation, and effecting the concentration of the several metals in separate strata or layers above or below the other substances in the matte, according to the relative specific gravity of the various component substances of the ore.

The production of this fluxing and separating compound has been rendered possible by the discovery that asbestos, when combined with a suitable flux—as, for instance, borax—will quickly reduce the ores to a liquid state at a comparatively low temperature, and will effect a thorough separation of the metals from the silicates. The flux facilitates the fusing of both the ore and asbestos.

For the purpose of promoting the activity of both the asbestos and the flux, to effect the separation of a maximum percentage of metal contained in the ore or matte, as well as to reduce the time necessary to effect such separation, and so effectually dispose of the sulfur and other gases, there is added an oxygen-furnishing agent. The inventor has found in his experiments that permanganate of potash is a chemical well suited for the purpose, as it readily gives off oxygen, and by the promotion of combustion serves to greatly reduce the time necessary to effect a complete separation of the various component substances of the matte.

The process covered by one of the patents embraces those steps which are essential to the practical use of the compound above described. In its broader aspect the process consists in mixing the ore with asbestos and the flux—preferably borax—and in subjecting the ore thus treated to the action of heat, either with or without the aid of an oxygen-producing agent, such as the potassium permanganate above referred to, or a mechanical appliance for projecting a blast of air upon the heated matte.

A third patent recently issued to Doctor Miller associated with Thomas McCormick of the same place, discloses an invention of more than usual interest in view of the prominence assumed of late by gas and vapor motors. The device is primarily designed for the production of an explosive hydrocarbon vapor for the supply of both the explosion chamber and ignition burner of the engine or motor. The carbureter, embracing both air and oil chambers, is placed in communication with the exhaust of the motor, and the exhaust fluid is forced by its own expansive energy through one or more carburetting chambers for enrichment, and is then

returned to the explosion chamber and ignition burner, so that the fluid is caused to pass in a cycle through the motor and carbureter to insure a continuous and completely automatic feed of the engine. The employment of carbureters of various types in the specified relation is contemplated, but the carbureter disclosed in the patent comprises a carburetting chamber, a vapor chamber communicating therewith, a heating tube extending through said chambers, and means for leading the exhaust fluid from the motor to the tube to heat the chambers prior to the delivery of said fluid to the interior of the carburetting chamber, from whence it escapes to the vapor chamber and thence to the engine.

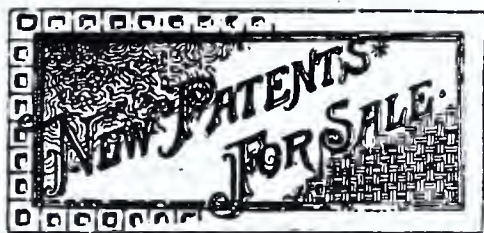
Samuel J. Miller, of Mt. Pleasant, Pa. is an owner of one-fourth interest in the last patent.

John A. Mangold, Moundsville, W. Va. Two patents. Toy or Advertising Device: Combined Badge and Pencil Holder.—The advertising device is a very amusing and attractive toy which is especially designed to be placed in show windows and similar places. A casing is employed, the lower portion of which is fitted up to represent a miniature stage and having a prize-ring in the center thereof. The upper part is completely closed, and contains a simple spring motor having a driving shaft provided with suitable counterweights and a retarding fan. From this shaft is suspended a fine black thread or wire which is invisible, and to the lower end of the wire are secured one or more puppets, either in the form of dancers or prize fighters. When the motor is operated, the puppets are swung back and forth and gyrate about the stage in a most amusing manner, apparently alive and under no control, as the operating mechanism is completely hidden.

The badge and pencil holder is formed of a single length of wire, which is bent intermediately into an inverted U-shaped, the sides of which are then twisted into corresponding spring coils, thence extended upwardly and crossed so as to cooperate with the U-shaped part and form pencil-gripping jaws. After being crossed, the terminals of the wire are bent downwardly to form prongs which are passed outwardly through a pocket so as to fasten the device, and to be inserted into a button or badge commercially known as a "hollow back" button. It will be understood that the pencil-gripping jaws are within the pocket, and are adapted to grip a pencil when the latter is thrust into the pocket.

Ira W. Collins, Kirksville, Missouri. Collar and Cuff Lining.—Damage to collars and cuffs by frequent laundering is obviated by this device, which is in the nature of a waterproof lining of the shape of the collar or cuff, with one edge rolled over so as to detachably embrace the upper edge of the collar or the outer edge of the cuff, with its opposite ends provided with button-holes to register with the button-holes of the collar or cuff. The lower edge of the lining is held in place by means of hooks elastically connected to the lining and adapted to embrace the lower edge of the collar or the inner edge of the cuff.

Henry J. Heider, Templeton, Iowa. Draft Equalizer. This improved device embodies an even bar fulcrumed at one end upon the tongue or pole of the vehicle, with a whiffletree at its outer free end. A horizontally swinging member is fulcrumed to an intermediate portion of the even bar, with a draw bar pivoted intermediately to the free end of the member, with one end projected across the pole, and provided at opposite ends with whiffletrees. From an intermediate portion of the swinging member a flexible connection extends rearwardly to some fixed portion of the vehicle.



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Inventions That Succeed.

It is a curious fact that the inventions which, as a rule, are most remunerative to the promoters are the simplest things—the articles that not only supply a long-felt want, but that make every one exclaim, on seeing them—“Why didn't some one think of that before?” The man who invented the safety pin, for instance, made thousands of dollars; the same is true of the steel pen, of the tack, of the clips that are used to fasten papers together, of hose supporters, of car couplings, of neck-tie clasps—of the thousand and one little things that we use so constantly that we never stop to remember that our comfort is due to the inventive genius of some one. The improved harvesters, typewriters, ginning machines, typesetters, etc., have made their inventors wealthy; but it is the apparently insignificant things, which were elaborated without much thought or time, and that cost but little to put on the market, that are most successful.

The inventor of a really good toy, for instance, is always sure of making money, and the man who is fortunate enough to devise some really practical addition to an article already in use, can rest on his earnings for the remainder of his life. Fortune and fame to the man who first thought of placing a small piece of india rubber on a pencil shield. The woman who invented the baby carriage is said to have made about \$50,000.

Much money has also been made by people who exploit inventions, or adapt them to the practical needs of humanity. There are still many things for which the world is waiting. A noiseless typewriter, for instance, would make its patentee rich enough to own a steam yacht. A device to effectually prevent a cow from switching her tail into the face of the milker, would be welcomed with joy. Every bottle maker, wine or spirit merchant and brewer in the world longs for a cork which, by some ingenious, yet

cheap arrangement, would automatically lock as soon as the bottle was emptied of its contents. A method of keeping gilding from rubbing off of crockery is the dream of all manufacturers of china.

Some Facts about Copyrights.

It is not so very many years ago that the Copyright Office issued a certificate on nearly every application presented. This has, however, been changed, and now the Register of Copyrights requires, in all doubtful cases, that a copy of the subject-matter to be copyrighted shall be filed before giving final action on the application and issuing the usual certificate. While the Copyright Office is purely an office of record for recording claims to copyright protection, there have been certain recent decisions by the courts, which have increased the scope of the work of the office, and helped towards a better administration of affairs. For instance, under the ruling in *Everson vs. The Librarian of Congress*, that the latter official could not be required to record the title of a book of blank forms as a preliminary to copyright protection, the Copyright Office has excluded from registration, blank forms, account books, ledgers, memorandum books, diaries, time and score books, which, though books in one aspect, are not so in the literary sense.

Moreover, the Librarian of Congress has decided that the words “prints,” “engravings,” “cuts,” and “designs,” which are embodied in the copyright statutes, refer to articles which are exchanged or sold for their artistic merit, and do not include such prints or designs as are attached or refer to articles of manufacture. This ruling excludes many advertising prints and labels, protection for which, must be sought, if at all, at the Patent Office. The difference between the fees for the Copyright and Patent Offices is considerable, and the practice is very different. In the opinion of the Patent Office, a print is a picture similar in kind to an engraving, cut or photograph, or any artistic representation or intellectual production, not borne by an article of manufacture, such, for instance, as an advertisement thereof.

A label is an artistic representation or the like, impressed or stamped directly upon the article of manufacture, or upon a slip or piece of paper or other material, to be attached in any manner to manufactured articles, or to bottles, boxes and packages containing them, to indicate the contents of the package, the name of the manufacturer, the quality of goods, etc.

There is one objection found to seeking protection from the Patent Office for the registration of a print or label, and it is this: The application must recite the particular class of goods on which the label is applied, or to which the print refers. It follows that there is nothing to prevent someone else using the same advertising print or label in connection with, or pertaining to, some other merchandise. This is a serious defect in the law for which

there appears to be no present remedy. One can well imagine the dismay of the owner following the discovery that an attractive advertising print relating to boots and shoes, was being used in every essential particular by another party to advertise rubber goods, for which no legal redress could be had. If the Copyright Office would protect this class of prints or designs, then no matter who used the particular print or design, or for what purpose it was used, the protection of the law could be invoked. Furthermore, lithographers and printers frequently devise new designs, and because they are not manufacturing the goods to which the designs relate, they are powerless to protect their own handiwork under the label and print laws as administered by the Patent Office. If the lithographer or printer could protect his work, then his customer would be obliged to order his future supply of the protected designs from him. If no protection is obtainable by the lithographer or printer, then the customer can go where he pleases and order the designs from the cheapest place. This is all right from the customer's point of view, but the lithographer or printer entertains a decidedly different opinion, and he is clearly entitled to some relief.

Most applicants for copyright protection think that their duty is ended when they file the title, or description of the article to be copyrighted, with the Librarian of Congress, though the law plainly says that two copies of every article copyrighted should be filed with the Librarian of Congress. Without the deposit of the copies, the copyright is not valid. Furthermore, the statute prescribes a penalty of twenty-five dollars for failure to file the copies in the Copyright Office. And it is right here that many applicants lose the benefit of the copyright protection secured. The entry of the title is one step. The filing of the copies is the final step. It is a pretty safe guess that fully half the copyrights entered each year are never completed by the filing of the copies. No copyright is safe to sue upon until the records have been searched and it is found that the copies have been duly furnished.

Electric Printing at Long Distances.

Apparatus for long distance printing has been introduced by the German postoffice department into the Berlin offices. The apparatus serves the purpose of distributing news in a manner similar to telegraphy, but it can be operated without special training on the part of the printer, requiring no more skill than a knowledge of typewriting. The machine is worked like an ordinary typewriter. The sending as well as the receiving apparatus prints the text. Any number of receivers can be connected. The receiver needs no operator, and prints the message as the typepaper is unwound.

Persons using the apparatus have to pay for the installation an annual rent of about \$5. No further fees are paid for sending or receiving messages. Already, about 400 private machines are in use.

The Fuel Problem and its Solution.

If the scarcity of fuel, which is now making itself felt, should stimulate inventors in devising and the public in using proper substitutes, it will at least have accomplished some good purpose.

In the matter of adulterations and substitutes for articles of food, this country seems to have made greater progress than was necessary for the public good, but, for some unaccountable reason, there has been no effort made to use coal dust, sawdust and oil briquettes, such as are extensively made and sold throughout Europe.

Apparently the public has made up its mind that coal is the only thing fit to use. Europe has learned a lesson in this respect which we will have to learn. The anthracite fields of Pennsylvania are not inexhaustible. There is bound to come a time when they will cease to give up coal to the hand of the miner. Perhaps the public will then face the situation and accept some of the substitutes which can readily take the place of coal.

The AGE has repeatedly called attention to what has been done along this line by Europeans, who are making use of waste fuel products to an extent, which, if practiced in this country, would solve the present problem. Coal dust, by itself, will not burn, but when mixed with other combustible substances, and compressed in the form of a brick, can be made to take the place of the best coal. The same is true of sawdust, peat and oil.

A company has been formed at St. Etienne, France, for the manufacture of petroleum briquettes composed of 97 per cent of petroleum and 3 per cent of hydrocarbon. The volume being equal, it weighs only half as much as coal and gives but from 2 per cent to 3 per cent of residue; it produces no slag; it does not “run” when lighted but keeps its form like coal; it burns without odor and without smoke; it may be soaked with impunity, losing none of its properties; it consumes without explosion or sparks and yet with a bright and long flame; and it may be kept indefinitely without deterioration. If a projectile should enter a ship's bunker filled with this fuel, there would be no danger whatever of explosion, the effect being the same as in the case of ordinary coal. The briquettes can be employed in any fire box or in any grate for domestic purposes. The manufacture of these briquettes is very simple and requires but little machinery. If necessary, the petroleum contained therein can be recovered, with a loss of only 5 to 7 per cent.

While the burning of crude oil has been tried too often to cause any question to be raised as to its success, there are some objectionable features connected with its use for domestic purposes. The odor and smoke arising from the burning oil is very objectionable to some people. No economical method has yet been devised to get rid of these objections. Gasoline is more dangerous and expensive.

A proper solution of the coal problem would seem to rest with the use of the briquettes made of coal dust, sawdust and crude oil. If an enterprising American should start their manufacture at the present time, the supply would not equal the demand. Should we not practice a more economic use of things about us, and adopt substances which nature has provided, in almost inexhaustible quantities, as a substitute for coal? We could then view with some degree of complacency the present struggle for supremacy between the operators and the miners, knowing that only the two parties to the controversy were suffering by its continuance.

SCIENTIFIC

PROGRESS.

New Insulating Material.

Mr. John A. Heany, of Philadelphia, Pa., has discovered a method of insulating metallic surfaces or wires with asbestos.

Heretofore the use of asbestos as an insulating material has been limited, by reason of the fact that it could not be applied to the metal in a thin pliable form and yet be made waterproof, fireproof, and adhesive under conditions of excessive heat applied through the metallic surface or extraneously applied to the asbestos covering. As is well known, asbestos is an absorbent of moisture and is not absolutely fireproof, because, if exposed to a Bunsen flame, the fiber of asbestos loses its flexibility, and becomes exceedingly brittle by reason of the driving off of the water of crystallization.

The principal object of this invention is to provide an insulation or covering for electric wires or metallic surfaces which shall be fireproof, waterproof, and sufficiently thin, pliable, and adhesive to permit the wire or surface to be bent into helices or coils without impairing the efficiency of the covering.

In carrying out this idea, the metallic wire or surface is first coated or covered with a paste or cement containing the following ingredients, to wit: first composition, fish-glue or gelatinous or albuminous substances combined with lime, either wholly or partly slaked; second solution, sulfate of ammonia, boracic acid, sulfate of soda, chlorid of ammonia, chlorid of soda, and water. After either the first composition or the second solution has been applied to the metallic wire or surface, the asbestos is first treated with the second solution containing the chemical salts, as above set forth, and is then dried, picked into flaky or fibrous form, and then twisted under pressure upon the coated and sticky wire or metallic surface. The asbestos covering thus applied is then covered or coated with a paste or cement containing the first composition mixed with the second solution of chemical salts, and, if desired, is again pressed down upon the wire or metallic surface. The coating or covering thus applied to the metallic wire or surface will be found to be a perfect insulation, water and fire proof, thin, pliable, and flexible, and adhering to the wire or metal surface under extraordinary conditions of temperature.

A New Belt-Tightener.

The General Electric Co. has obtained control of a patent on a belt-tightener invented by Mr. Norman C. Bassett, of Boston, Mass. In small electric motors designed to be belted directly to slow-running machines—such as printing-presses, type-setting machines, machine-tools, and the like—it is desirable to use a driving pulley of very small diameter in order to give a slow-running belt with a comparatively fast-running motor; but in such a pulley, the surface in contact with the belt is so short that some device is necessary to wrap the belt around as much of the pulley as possible, in order to give sufficient contact with the circumference of the pulley to transmit the power. As these motors may be used in all sorts of situations

and positions, a belt-tightener which can be placed anywhere around the pulley-shaft and on either side of the belt is a very useful contrivance, and this is what Mr. Bassett has devised.

He employs a support which is adjustable concentrically with the motor-shaft, and upon the support is journaled an idler-pulley adapted to engage the belt. Another support is also journaled concentrically with the driving-shaft, being likewise adjustable, and an arm connects the two supports, being pivoted to one and having a slidable engagement with the other. A coiled spring surrounds the arm and tends to pull the idler against the belt, thus keeping the latter tight. In one form of the invention, the motor-casing has an annular undercut groove concentric with the driving-shaft of the motor. In this groove is slidably mounted a curved plate to which the idler is journaled. The plate can be held against movement by clamping-bolts. Another plate is also slidably mounted in the groove and can also be fastened against movement, this plate carrying an eye. The arm is pivoted to the idler-plate and passes through the eye, its projecting ends having a coiled spring bearing against the eye and thus urging the idler into engagement with the belt.

Inventions Needed in Hotel Kitchens.

The amount of service to be obtained from one waiter or waitress is largely dependent on the arrangement and relative location of the dining-room and kitchen. From the distance which some establishments provide, considerable waste of time and energy results, and the help are made to travel over a great amount of ground. The writer has suggested for several years—but it is only just beginning to be appreciated by some hotel proprietors—that mechanical appliances are capable of improving the service in the dining chamber and of reducing its cost and extent.

The course of improvement will be in the direction of travelling conveyors, by which all used utensils will be returned direct from a central point, or points, in the dining-room to the cleaning departments, and there is no reason why the same methods may not be adapted to the delivery of food and drink into the dining-room, or at least to the serving-room. The kitchen would thus no longer be invaded by a stream of waiters. These would be replaced by a few trained servers, loading the conveyor at a central point, and the waiters would not be overheated, as they now are, not only by their exertions, but by entering the warm culinary departments. All orders would be transmitted in written form from a pneumatic station at the table, and all bill cards and bills returned in the same manner.

It is not too much to expect that the process of removal of table appliances will be effected by arranging for the entire table to be elevated through the ceiling to a chamber above, whence it will be replaced by a newly set table top, or by the descent through an enlarged central table leg, of the table contents, to be replaced by others on its return.

The elimination of the noise and clatter of the removal of dishes, and the improvement of the personal appearance and condition of the table attendants, may be thus effected within the next few years, and should place the service of modern restaurants on a higher plane.

These results will be attained if the subject is emancipated from the negligence with which it has hitherto been treated, and is dealt with as a matter deserving of trained technical attention.—*Cassier's Magazine*.

Braking the Speed of Vessels.

A Canadian has invented a device to stop vessels within a short space, even when they are going at full speed. The inventor has had engineers in the English navy, as well as in the mercantile marine, examine his device, and holds written certificates declaring their belief in the efficiency of his invention.

The invention consists of a pair of gates, designed to swing outwardly from the sides of the vessel, and to be held at right angles thereto by struts, attached to the gates at one end and at the other to plates sliding in covered ways, which have openings for the escape of the water contained therein. Fingers, extending from a rod, fold over the edge of the gate and keep it close to the side of the ship when it is shut. The gates are opened and closed by means of cranks and gearing.

The operation of the gates will not jar the vessel nor inconvenience the passengers. As soon as the edge of the gate is clear of the ship, the resistance of the water when the vessel is in motion will carry the gate outwardly and rearwardly. The gate will not fly quickly out, but will gradually assume a position at right angles to the sides of the vessel. The gearing, as well as the motive power for operating it, will be within the ship. It is possible to operate the gates either from the bridge, or from the engine room, and the inventor claims that when the gates are opened, the vessel will probably stop within her own length. The gates will not interfere with the general arrangement or appearance of the ship; in fact, it is intended to have them extend from the water line downward, and the shape of modern vessels will enable them to be made of good depth, thereby reducing their width.

In men-of-war, the inventor believes that his device will greatly facilitate manœuvres, and for steering in a narrow channel, will have no equal. By opening either one of the gates, the turning of the vessel will be greatly accelerated. It will also be of great service in minimizing the danger of collisions at sea.

Malleable Glass.

A lamp chimney that will not break on a lamp has finally been made. This is one result of the recently invented process of making malleable glass, something which scientists have been striving to discover for thousands of years. Centuries before the Christian Era, the Egyptians, the Phoenicians, the Greeks tried to make a glass that would mash but not break. It remained for an American to solve the problem. His name is Louis Kauffeld, and he lives in Indiana. His invention may be considered as the greatest achievement of the present age in the art of glass manufacture. Mr. Kauffeld is not willing to divulge the secret of his method, but he has given numerous tests with the finished product to show how malleable it is. It appears to be impossible for heat to break it. Water was boiled in a chimney made from the new glass, without injury to the chimney. Another was placed over a fire and heated to such

a degree that one side shrunk in, as though it were about to melt. In neither case, however, was there the least sign of a crack. The glass seemed to be as clear as the ordinary material, and it is more elastic in its molten state. The inventor asserts that the new product contains neither lime nor lead. He has not as yet used it for anything but lamp chimneys.

Making Artificial Sand.

A resident of Pittsburg, Pennsylvania, Mr. Joseph A. Shinn, has patented a new method of making artificial sand from slag. He claims that the resultant product can be used in the same manner, and as a substitute for ordinary sand in the manufacture of mortar, cement, tiles, brick, etc. Many efforts have been made to utilize slag, but, with very little success, principally because the methods employed were so expensive that the product would not realize sufficient to repay the cost. The only apparatus necessary in the present case are two water nozzles or jets placed on opposite sides of the furnace opening through which the slag is drawn, and arranged to direct opposite streams of water against the molten slag. These jets are connected with a suitable supply of water under pressure and provided with valves, so that the supply and pressure may be regulated to suit different conditions. A chute or apron is provided for carrying off the slag after it has been acted upon by the double streams or jets.

As the slag flows from the furnace, water is turned into the jets, preferably at a high pressure—say from fifty to one hundred pounds—and directed onto and through the stream of slag. The effect of the double stream of water on the slag is an instant disintegration and a consequent reduction to a fine sand, the fineness of the sand depending to a considerable extent on the quantity and force of water supplied. This disintegration is not the effect alone of the cooling of the slag by the water, but is aided by the friction of the particles of slag which are driven together by the action of the two streams of water. This has been fully demonstrated by using the water on one side only, for when a single jet or stream is used, a large amount of the slag will not be reduced to sand and must be run through a crusher and rollers before it can be used.

The slag-sand produced by the process can be readily distinguished from other slag-sands in a large number of ways, but most easily by its great density, a bushel of ordinary slag-sand weighing from forty to fifty pounds, while the slag-sand made according to the above process will weigh from sixty to seventy pounds.

Electric Mouse Trap.

The Paris Electrician describes a new invention, an electric mouse trap. The apparatus consists of a plate which conducts the electric current. Above this, another conducting plate is placed, which is smaller and is not connected with the lower one when the trap is not in operation. A hook to which the bait is fastened is connected with the lower plate. Wires form the connection with the source of electricity. To reach the bait, the mouse has to enter between the two plates which are so close together that when he enters the connection is closed, when he is promptly electrocuted—a weak current being sufficient for the operation.

PINE-NEEDLE PRODUCTS.

CONSIDERING the vast extent of pine lands in the South and West of this country, it is strange that greater use has not been made of pine needles.

Some years ago, a party in New Jersey obtained a patent on the manufacture of a cigar out of pine needles, and the way he constructed

pine needles, but fiber of a very fine quality can also be obtained, as well as oil and pine needle extract. The people of the United States are not taking advantage of this useful product as they should. We can learn a lesson from what they are doing over in Germany.

The Thuringen Mountains of southern Germany are the home of the makers of pine-needle oil, extract, and similar products, which are used the

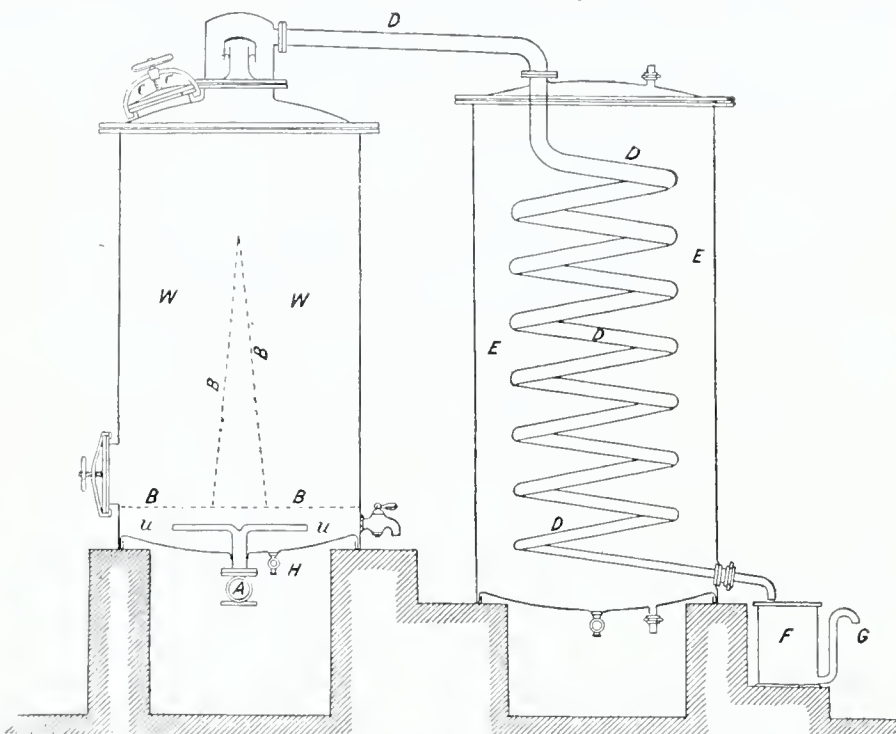


DIAGRAM NO. 1.

the cigar was to use the pine needles as the filler, and employ an ordinary cigar wrapper, thus the pine needle cigar looked like the ordinary cigar from the outside, but when smoked, one could tell from the odor that it

world over for rheumatic and kindred complaints.

For the manufacture of these articles on a small scale, an ordinary pharmaceutical distilling apparatus can be used; but for a large industry,

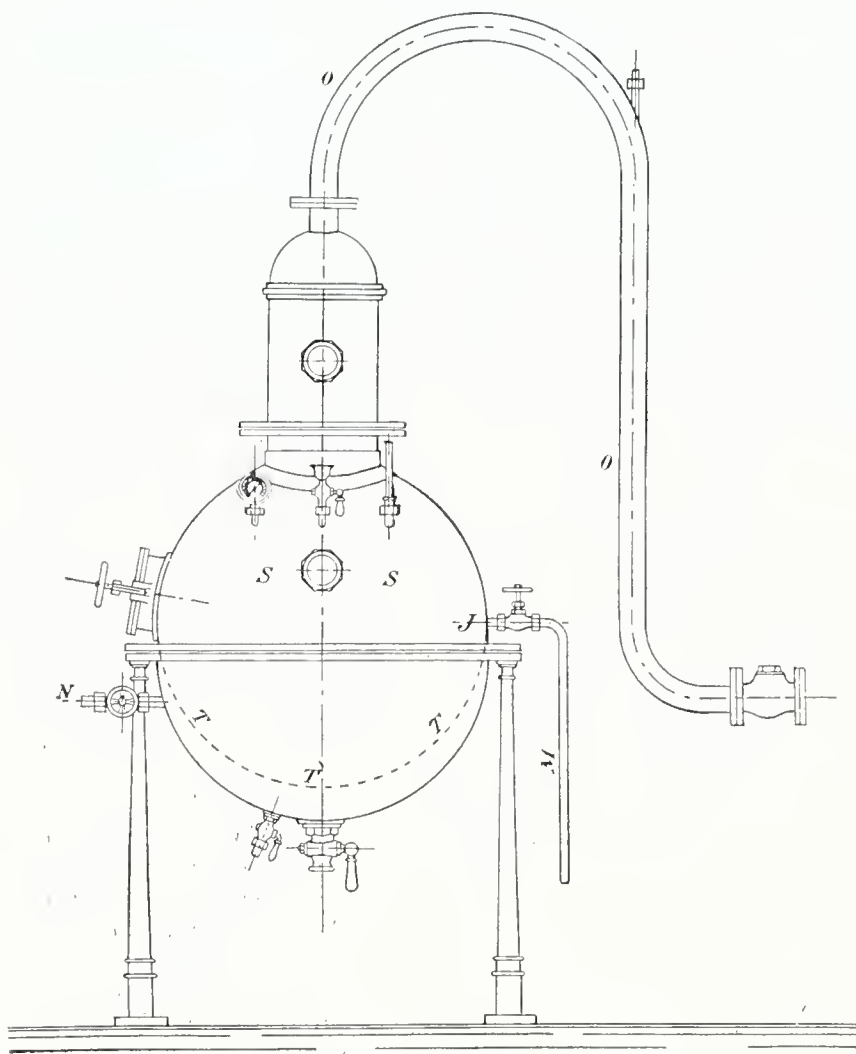


DIAGRAM NO. 2.

was not a "Genuine Havana." For some reason the manufacturer of the cigars did not succeed, although it was claimed that the smoking of the cigar cured various pulmonary complaints, from consumption down to the ordinary cold in the head.

Not only can cigars be made from

a specially designed apparatus must be employed.

The needles and very young shoots of the various kinds of pine trees, more particularly those of the *Pinus pumilio*, are used for the manufacture of these products. They are collected in the latter part of May or the first of

June and are cut up into small pieces and put into the cylinder of the distillation apparatus, (diagram No. 1.) through opening C. At A, steam enters the base of the cylinder and is conducted underneath the bottom B, which is usually made of zinc and is perforated, the central part rising in the shape of a cone or funnel. Through the perforations, the steam finds its way to the needles heaped up in the cylinder, and the volatile oil contained therein are freed and make their exit, together with the steam, by means of a pipe D, which connects with the cooling cylinder E. Cold water runs continually from the top into the cylinder, playing around the coil D, and cooling its contents and then finding an exit at the bottom. Thus, the contents of pipe D, become condensed and the liquid runs into the bottle F, at the base of the cooling cylinder, where the oil is found swimming on the surface. The oil must from time to time be skimmed off, while the water runs out at pipe G. As the water is not entirely free from the oil, it is advisable to have it subjected to a rectifying process in order to save the oil, which would otherwise be wasted: or the separation can be effected by the application of salts.

When the steam has extracted the oils from the mass in the distilling cylinder, the condensed water (containing resinous, albuminous, and tannated substances) drops through the perforations B, and collects in space u below: thence it is drawn off by means of tap H, and taken by a pipe to the vacuum apparatus shown in diagram No. 2, which represents the outside of the apparatus, while the dotted line T, shows the lower part of the boiler on the inside. The boiler is half filled with the condensed water, which, by means of steam entering through pipe N, and passing underneath the boiler to find its exit at J, into pipe M, is heated and caused to evaporate. This process is greatly aided by the fact that the space S, above it is void of air, this having been drawn out by means of a pump, connected with the apparatus by pipe O. The evaporating process is continued until the contents have reached the desired consistency. The extract is then drawn off, mixed with pine-needle oil in order to give it the necessary perfume, and put up in jars.

The mass left in the cylinder W, after both the above-described processes are finished, is dried and put into a machine to separate and loosen the several fibers. These are then perfumed with pine-needle oil, put up in assorted packages, and sent to the different markets, where they are sold for pillow and mattress stuffing. The fiber is considered very healthful and vermin-proof.

New Use for Chicory.

Chicory has long been cultivated as a substitute for coffee; but the fact that it has properties adapting it to be used in the manufacture of alcohol has been only recently demonstrated. The chicory root, it seems, contains about twenty-four per cent. of fermentable substances, which by boiling two or three hours, and by adding a little acid, can be readily transformed into sugar. Recent experiments show that an acre yields more chicory than potatoes, and the chicory produces more alcohol than the other. The alcohol from chicory is said to be of a very pure flavor, and of a peculiar but not unpleasant taste. On the other hand, the root requires better soil than the potato.

Air Supply for Divers.

Two French scientists have invented an improved apparatus to provide aid for divers. A large number of people are engaged in this occupation, some in occasional work under water, as for instance the recovery of valuables or of drowned bodies, but most of them in the pearl, coral and sponge fisheries. The invention enables the driver to remain under water for a long time without being provided with fresh air from without. The apparatus consists of a box containing clockwork. At certain intervals of time, a tablet of bi-oxide of sodium is allowed to fall into a small vessel containing water. This results in a lively development of oxygen, and the neutralization of all poisonous gases caused by the process of breathing. If the apparatus is connected with an ordinary diver's helmet, the man can remain under water for an hour. The contrivance can also be used in poisoned or dangerous air—as for instance, in laboratories or burning buildings filled with smoke—without running the least risk of asphyxiation, so that the invention may become of importance.

Advantages of Electric Motor Driving.

One advantage that often comes from the use of the electric motor for machine driving, is the comparative ease with which it may be ascertained whether a particular piece of machinery thus driven, is operating at its highest efficiency. This can be done by comparing the power consumed by the motor in driving it with the power used in driving another similar machine. For example, it has more than once been found that certain printing presses of a given make have been consuming from one to two horse-power more than another similar press, notwithstanding that the makers pronounced their apparatus in perfect running order, and in consequence placed the cause of the discrepancy on the electric motor. A brake test of the motors or an exchange of motors quickly showed the fallacy of this contention, and an easing up of the bearings of the press in different places usually sufficed to get rid of this waste of power.

Increase of output of machinery driven by electric motors is, however, after all, the great desideratum which is achieved, and far outweighs in importance the several other advantages incidental to electric driving, the saving of head room, for example, the absence of long lines of shafting, and the avoidance of power wastes. Indeed, the value of the power, whether furnished by shafting or by the electric motor, as compared with the importance of increased product, is nearly negligible.—*Cassier's Magazine*.

Substitute For Sugar.

Many things have been made out of coal tar, but if one should see this stuff, he would never expect to obtain saccharin from it. The *British Medical Journal*, in discussing this matter, says:—

"It (saccharin) is one of the many bodies made out of coal tar, and is not a sugar at all, although many people are quite convinced it is. It is not only used to sweeten beer, but it is now also employed in the manufacture of syrups, jams, lemonades, wines, cider, brandy, pastry, and chocolate. Special substances of this nature are on the market for sweetening cider and brandy."

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies for \$1.50.—Please give correct data in ordering.—Address

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Album stand. Photograph..... R. Aizenman
Blotting pads, &c. Corner for..... S. A. Keller
Brushes, &c. Back for..... S. A. Keller
Button hooks, &c. Handle for..... S. A. Keller
Lamp body..... C. A. Haas
Lid for puff boxes, &c..... S. A. Keller
Plate..... G. R. West
Rug..... A. Petzold
Sewing machine table..... F. G. Hogland
Toilet articles. Handle for..... R. R. Debacher
Vending machine casing..... G. W. Gates

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Abdominal and back supporter..... H. C. & L. C. Rash
Aerating agitator..... B. D. Hooper
Agitator..... H. M. Martinson
Ash pan. Safety..... T. F. O'Connor
Auger. Well..... R. O. Newell
Automatic gate..... J. H. Wilson
Axle..... W. H. Davis
Back pedaling brake..... E. G. Hoffmann
Baling press..... J. A. Spencer
Barrel head fastening..... E. C. Shears
Bat and explosive. Ball..... J. C. Schwanengel
Bearing. Roller..... A. E. Henderson
Bed frame..... F. W. Walker
Bed. Invalid..... E. B. Dones
Bed pan cover..... H. C. Lipps
Belt. Leather..... J. L. Fahey
Bicycle brake..... G. Stabile
Bicycle cushion frame..... F. B. Case
Bicycle saddle post..... O. F. Reeves
Blank threading machine feed mechanism..... J. H. Haskins
Blanket guard..... H. M. Williams
Blast furnace. Iron..... M. P. Boss
Blinds. Apparatus for operating Venetian..... T. Summerton
Boat fender..... W. H. Higgins
Bolt and fastener therefor..... A. H. Lewis
Bookbinding..... J. L. McMillan
Book for holding and filing sales slips, &c..... J. F. Huber
Book. Manifold copy..... J. C. Browning
Books. Device for fastening loose leaf..... J. A. Waldo, Jr
Boring machine..... W. S. Sherman
Bottle capping machine..... J. D. Schell
Bottle. Non refillable..... H. B. Reubelt
Bottle. Non refillable..... J. J. Bentz
Bottle rest. Adjustable..... R. Schmidt
Bottle stopper..... W. H. Sherman
Bottle washing machine..... W. J. Cunningham
Box banding tool..... P. W. Mullany
Box strap holder..... J. E. MacMurray

Box wrapping machine..... E. W. Bryant
Brake beam fulcrum..... P. T. Handiges
Brick. Burning..... J. Peck
Brick machines. Plunger adjusting mechanism for re-press..... J. Walker
Brick mold..... O. M. Reif
Bridge. Bascule..... C. F. Hall
Bridge construction..... G. M. Cheney
Bridge overdraw check..... J. B. Schott
Buckle..... D. M. McLean
Buckle. Harness..... C. H. Johnson et al
Buckle. Lock..... C. A. Goosy
Building block..... F. A. Searight et al
Buug..... H. C. Blanck
Bunsen burner..... W. H. & G. E. Russell
Burglar alarm..... F. C. Robinson et al
Button or stud. Separable..... J. L. Vredenburg
Can wrench. Fruit..... W. F. Kerr
Car and elevating track. Automatic..... W. L. McLoughlin et al
Car coupling..... 2 pats. J. E. Wade
Car coupling. Automatic..... S. Cox et al
Car door fitting..... 2 pats. G. Krygoski et al
Car grain door..... T. N. Bon Durant
Car rigging or draft appliance. Railway..... S. H. Jansen
Car side guard..... J. H. Donnelly
Car step attachment..... J. H. Fassett et al
Car wheel..... E. S. Jennings
Cars. Combined grain door and loading and unloading platform for box..... J. S. Bender
Cars, &c. Step for..... C. W. Keyser et al
Carding machine..... W. H. Hoyle et al
Carding machine..... H. A. Owen
Carriage flue construction. Steam..... J. H. Bullard
Cartridge shell gaging machine..... P. Butler
Cash register..... A. L. Wood
Cash register..... P. Yoe
Caster..... G. D. Clark
Casting apparatus..... reissue. D. T. Croxton
Castings. Annealing receptacle for..... A. W. McClary
Cellulose acetate. Making..... B. W. Boesch
Cellulose esters. Purifying..... B. W. Boesch
Chute..... 2 pats. F. L. Sackett
Cigar shaper..... G. G. Singley
Circuit breaker reverse current device..... H. P. Ball
Circuit breaker time limit device..... H. P. Ball
Circuit interrupter..... M. S. Walker
Circuits. Device for overcoming alternating currents in direct current..... H. Brockelt
Clipper. Hair..... G. H. Coates
Clock. Electric..... H. E. Andersson
Clock. Electric..... A. F. Poole
Clock. Repeating..... J. Kienzie
Coating machine..... G. Carlson
Coating machine..... M. A. Smith
Coherer..... G. W. Pickard
Collar blanks, &c. Machine for folding..... G. J. Dormandy
Converters, &c. Means for winding..... E. R. Gill
Convertible chair..... T. W. Washburn
Copy holder..... T. P. Chandler
Corn husking machine..... J. K. Smith
Corn shock carrier..... N. W. Lyon
Cracker stacking machine..... B. Prouty et al
Cultivator..... J. A. McKinnon
Cultivator..... A. H. Kopperud
Cultivator. Lister..... W. S. Graham
Curtain bracket. Adjustable..... 2 pats. L. A. Watts
Curtain brocket. Window..... A. C. Miller
Cuspidor rack..... F. F. Ball
Cyanid compound and making same..... G. Erlwein et al
Cycle brake..... W. Brankowitch
Damper regulator..... S. Coats
Demijohn covering..... F. S. & L. Thomas
Digging device. Ditch..... O. Peterson et al
Dilator..... E. Beist
Dipper. Milk..... F. J. Keis
Display box or tray. Folding..... C. S. Morris
Display cabinet for packets..... A. W. M. Martin
Door catch and buffer..... F. E. Ransdell
Door check and burglar alarm. Combined..... W. F. Grimes
Door hanger..... G. G. Meyer
Door hanger..... J. F. Clift
Door holding device..... L. H. Lucabaugh
Door or window alarm..... J. G. Eberstein
Drafting garments. Dress cutting instrument for..... G. V. Valentine
Driving, braking, and coasting mechanism..... F. B. Case
Drying reel..... C. D. Weaver
Dumb bell, Indian club, and pulling or swinging bar. Combined..... F. R. Buck
Dust guard..... 2 pats. J. S. Patten
Ear muff..... L. Wile
Eccentric. Adjustable..... H. Graff
Egg case..... J. A. Bastle et al
Electric accumulator plate..... A. Fischer
Electric attachment..... J. C. Meloon
Electric controller..... W. H. Clarke
Electric controller..... J. B. Linn
Electric generating systems. Controlling device for..... J. H. Bickford
Electric motor controller..... L. A. Tirrill
Electric motor controller..... 2 pats. F. A. Merrick et al
Electric motor coupling..... F. E. Case
Electric snap switch..... L. W. Downes
Electric switch..... H. P. Ball
Electrical position indicator..... A. S. Hubbard
Electrically protected structure..... H. M. Sutton et al
Electromedical appliance..... J. O. Fowler, Jr
Electromedical appliance..... J. H. & A. T. Kliegl
Electrotype shaving machine..... F. Wesel
Elevating and dumping apparatus..... R. Holloper
Emergency brake..... W. W. Hopkins
Enameling metal ware..... G. W. Ketcham
Engine attachment..... V. Z. Caracristi
Engine sparking igniter. Explosive..... J. B. Hicks
Engine stop. Automatic..... N. C. Locke
Engines. Apparatus for distributing the primary current for electric ignition by coils and igniters in explosive..... A. C. Krebs
Envelop..... G. D. Van Arsdale

Engines. Incandescent igniter for explosive..... C. W. Weiss
Etching designs..... I. Kitsee
Exercising device..... W. M. Moseley
Eyeglasses..... A. K. Hawkes
Fabrics. Means for decorating..... A. Vericel
Fan. Automatic..... J. D. Williams
Fan motor case..... H. R. Wellman
Fan. Rotary hand..... B. D. Straight
Farm gate..... L. K. McClellan
Feather crushing and pulverizing machine..... F. Franke
Feed water heater and purifier..... J. E. Crawley
Feed water purification system..... A. Sorge, Jr
Feeding rack and shearing table. Combination sheep..... V. Baughman
Fence post. Braced..... W. M. Smith
Fence. Wire..... I. N. O'Neal
Fertilizer distributor..... E. L. Braxton
File..... L. C. McNeal
File. Periodical..... C. L. Prindle
Firearm. Breech loading..... J. Bincette
Firearm magazine..... L. F. Bruce
Firearm sight..... J. T. Brayton
Fire escape..... J. M. Brazill
Fire lighter blocks. Machine for making..... J. R. Thomas
Fire lighter machine..... E. Pollard et al
Fireproof wall plaster..... C. R. Harris et al
Fireproof wall plaster. Composition of..... C. R. Harris et al
Fish trap..... G. Merle
Flow arresting device..... H. A. Fiske
Food extracts. Obtaining..... G. Eichelbaum
Fracture apparatus..... J. P. Gordon
Furnace..... G. Westinghouse
Furnaces. Utilizing waste heat in connection with smelting..... R. Brown
Garment supporting device..... L. Roser, Jr
Gas and air mixer..... S. Broichgans
Gas burner. Incandescent..... T. Gordon
Gas engine..... W. A. Leonard
Gas generator. Acetylene..... C. W. Caldwell
Gas lighter. Electrical..... J. G. Poppert
Gas main stopping or closing device..... A. Postley
Gas tar residuum. Treating..... J. T. Lowe
Gearing..... J. R. Carter et al
Glass by means of electricity. Manufacture of..... J. Bronn
Glass ladle..... E. N. Baldwin et al
Glass press..... P. Ebeling
Glass presses, &c. Stroke regulating mechanism for..... P. Ebeling
Glove..... D. F. Morgan
Governor and valve operating mechanism for gas or vapor engines..... E. H. Korsemyer
Grain binder. Automatic..... J. F. Appleby
Grain spout..... W. D. Dickson
Grate bar. Hollow..... T. J. Pritchard
Greenhouse construction..... F. Van Assche
Grinding machine stop motion. Cutlery..... A. Gould
Grinding, polishing, or buffing machine..... C. F. Church
Grooving machine. Lumber..... E. Pollard
Gun carriage..... O. Lauber
Harvester binder..... J. A. Cowan
Harvesting machine knotting device..... A. Castelin
Hat stiffening machine..... N. Leveque
Hay loading derrick. Portable..... E. Brust
Heater mounting. Electric..... E. E. Gold
Heating furnace. Water..... H. A. Fraser
Heating system. Vacuum steam..... J. R. Wade
Heel. Detachable cushion..... W. S. Estey
Hinge..... C. H. Foster
Hinge. Seat..... L. D. Petre
Hook and eye..... W. Fleischer
Hoop lug..... P. C. Jurs, Jr
Hopple. Horse..... W. L. Morrissey
Hose coupling retainer..... W. F. Bowers
Hose supporter..... M. B. Hammond
Hot air and water or steam heater. Combined..... A. L. Logan
Hot air furnace..... C. H. Foster
Hub. Vehicle..... E. B. Stearns
Hydraulic press for thick fluid substances..... G. von Susskind
Hydrocarbon burner..... J. W. Neumann
Hydrocarbon burner..... W. N. Best
Hydrocarbon burner for stoves or furnaces..... G. A. Greene
Hydrocarbon burning apparatus. Liquid..... W. H. & G. E. Russell
Hydrocarbon motor..... W. J. Still
Index. Cross..... R. L. Hunter
Igniter. Revolving electric..... A. G. Ronan
Igniter. Self..... S. Waterman
Injector. Steam..... J. Desmond
Insulated rail joint..... 2 pats. G. L. Hall
Internal combustion engine..... R. Diesel
Invoice and balance sheet..... B. A. Allison
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Irrigator. Portable..... J. F. Chase
Key head. Winding..... T. W. R. McCabe
Knob. Door..... J. R. Fletcher
Lacing tip machine. Shoe..... C. D. Weaver
Ladder and bench. Combination step..... J. T. Writh
Ladder. Extension..... W. H. Sibley
Ladder. Fire..... S. R. Henry
Lamp burner..... F. Lehmann
Lamp. Electric arc..... E. A. Edwards
Lamp. Electric arc..... R. Fleming
Lamp. Incandescent..... H. E. Meyers
Lamp. Incandescent electric..... G. C. Webster
Last..... D. L. Purinton
Latch..... D. W. Tower
Leg. Artificial..... M. C. Baldwin
Lifting jack and air pump. Combined..... J. G. Schmidt et al
Lighthouse. Floating..... J. C. Williams
Lightning arrester..... C. E. Egan
Lightning rod..... J. O. Wilson
Lime burning apparatus..... G. A. Mace
Linotype machine attachment..... A. D. Smith
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Locomotive..... L. Atwood
Loom..... O. L. Owen
Loom beam lock..... H. H. McLean
Lubricating device..... H. G. Reist
Lubricating device..... F. B. Duncan

Lubricator..... F. Cartledge
Magnetic separator..... 3 pats. J. P. Wetherill
Mail delivering and catching device..... W. J. Noble
Mantle support..... J. E. Murray et al
Metals from ores. Apparatus for extracting..... J. Randall
Microtome knife..... E. Bausch
Mirror support. Folding..... B. C. Lyon
Mowers, reapers, &c. Cutting apparatus for..... 2 pats. E. A. Johnston
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Musical instrument. Mechanical stringed..... R. Gabrielsky
Necktie..... F. A. Arbenz
Numbering apparatus. Consecutive..... O. G. Bartusch
Nut lock..... L. McConnell
Oar attachment..... M. Linder
Odds indicator..... D. W. Marion
Oil cake packing apparatus..... A. W. French
Oils. Producing varnish..... W. A. Smith
Oiling device..... A. O. Wyman
Ordnance..... J. Kurig
Ore slimes. Treatment of..... H. L. Sulman et al
Ores for blast furnaces. Treating fine iron..... A. D. Elbers
Ornamenting surfaces..... J. P. Rudolph
Oyster opening tool..... S. Blagden
Packing. Metallic..... T. Smith
Paper bag..... N. Laird
Paper bags. Making..... D. Appel
Paper board burial caskets. Mold for making..... E. A. Post
Paper box. Folding blank..... D. I. Winslow
Paper hanger. Wall..... J. P. Cannon
Paper making machine suction box cover..... W. M. & T. M. Gilbert et al
Paper trimming and pasting machine. Wall..... J. P. Sproot
Paper. Waterproofing..... C. S. Bird et al
Pen. Fountain..... R. T. Gillespie
Photo engravers' plates. Machine for beveling..... F. Wesel
Photograph mounting apparatus..... I. G. Grant
Photographic apparatus. Automatic..... G. N. Pifer
Photographic apparatus. Coin controlled..... G. N. Pifer
Photographic apparatus. Means for loading automatic..... G. N. Pifer
Photographic apparatus. Shutter for automatic..... G. N. Pifer
Photographic plate..... G. N. Pifer
Photographic plate holder..... W. H. Lewis
Photographic printing frame..... W. H. Lewis
Photographing and exhibiting kinematographic pictures. Apparatus for..... L. U. Kamm
Pictures. Apparatus for animated..... J. Bianchi
Pipe coupling mechanism. Railway steam or air..... H. H. Warner
Pipe joint. Flexible..... H. H. Warner
Pipe wrench..... F. A. Palmer et al
Plane..... L. C. Clark
Planter. Corn..... L. P. Graham
Plastic material. Feeding mechanism for presses for..... J. R. Masecar et al
Plate feeding apparatus. Magazine..... G. N. Pifer
Playing ball..... 2 pats. E. Kempshall
Plow..... J. Buchanan
Plow..... J. A. & C. L. Shuping
Plow..... H. Bryan
Plow. Sulky..... W. W. Robinson
Polishing strip..... C. C. Allen
Postal car and station appliance..... L. Schmiedeeke
Postman's rack..... C. J. Weeks
Power transmitting device for hand driven mechanisms..... F. W. Wild, Jr
Printers' furniture..... W. G. Slauson
Printing machine. Multicolor..... H. F. Bechman
Printing. Multicolor..... H. F. Bechman
Printing press gripping mechanism..... M. Schmidt et al
Printing with sulfur dyes..... E. Voetter
Projectile..... J. B. Semple
Pulley block. Differential gear..... R. Lavery
Pump valve..... D. C. Word
Punch. Ticket..... H. Cottrell
Pyrotechnic device..... T. Lloyd
Rail joint..... M. Barschall
Rail joint..... J. E. Hammond
Railway bed..... M. Haas
Railway carriages, &c. Coupling for..... J. Willison
Railway signaling device..... H. Pratt
Railway vehicle. Suspended..... W. Schmitz
Railways. Vehicle to be used in electric traction on..... G. Cawley
Razor cleaner..... H. Schweitzer
Recording apparatus for reciprocating bodies. Distance..... E. A. Whitehead
Reel..... J. Shaw
Regulator..... H. B. P. Wrenn
Revolver..... J. D. Robertson
Revolver lock..... J. H. Wesson
Roller brake..... L. H. Bill
Rolling hoop..... E. P. Hinman
Roofing. Cement..... H. Brock
Rotary engine..... A. Dahlen
Rotary engine..... A. C. Eck et al
Rotary engine..... 2 pats. E. L. Sill
Rubber. Producing a composition of matter to be used as a substitute for..... O. A. Bailer
Rule, square, compasses, and comb. Combined pocket..... C. P. Hartley
Safe or vault door..... H. D. Hibbard
Sample case. Folding..... C. S. Morris
Sash lock and lift..... C. W. Robison
Saw..... J. Tuttorow
Saw set..... H. E. Vick
Saw spacing device..... F. Yost
Scale. Weighing and price spring balance..... O. O. Ozlas
Scales. Spring balance..... O. O. Ozlas
Sealing device. Vacuum fruit jar..... S. Adlam
Seam. Stitched..... G. H. Diamond
Sewing machine braiding attachment..... L. Smith
Sewing machine. Fabric..... J. W. Hyatt
Shade bracket. Adjustable..... A. Hanson

Shade and curtain pole bracket. Window..... J. P. & T. W. Sweeney
Shade bracket. Adjustable..... A. Hanson
Shade bracket. Adjustable..... L. A. Watts
Shade hanger. Window..... J. B. Merkel
Shade holder. Window..... J. H. Donaldson
Shade roller hanging apparatus..... J. Stonebraker
Shaft support. Vehicle..... I. D. Cady
Shield for personal wear..... L. H. Catzed
Shirt front and braces. Combined..... M. E. Poore
Shock loader..... A. C. Houdyshell
Sideboard. Combination..... J. T. Hicks
Sifter. Ash..... A. L. Rundell
Signaling apparatus..... J. R. Mead
Skelp bending machine..... G. G. & R. O. Blakey
Skins. Splitting..... F. W. Moore
Smoke consumer..... J. P. Kelly
Smoke conveyer..... W. L. Gale
Smoking pipe..... C. P. Remore
Socket. Regulating..... L. F. Bogia, Jr
Sodium cyanid. Making..... F. Roessler
Speed regulator..... H. P. White
Spinning head..... F. A. Breeze
Spinning machine cleaner..... S. Mock et al
Spinning spindle..... C. E. Lovejoy
Springs or coils. Apparatus for the continuous manufacture of spiral..... A. R. Cole et al
Sprocket wheel..... D. C. Jackling
Square..... A. L. Lundgren
Stair pad..... H. H. Sanderson
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Stamps, drop hammers, &c. Safety device for..... C. A. Thornton et al
Stamps or labels upon envelopes, cards, &c. Machine for affixing postage..... R. H. Strong
Stamping press. Relief color..... R. F. Sproule
Steam boiler..... J. A. Schlehr
Steam engine. Aero..... S. J. Corrigan
Steam generator..... W. Norris et al
Steam generators. Superheater for..... H. Webster
Steering apparatus. Vessel..... P. L. Ennor
Stone. Molding artificial..... F. Orlikowski
Stone or ore crusher..... D. C. Robinson
Stove. Cooking..... W. N. Moore
Stove. Cooking or heating oil..... M. L. Stone
Strainer and ventilator. Combined milk..... P. Weise
Sulky..... J. B. Tait
Surgical appliance..... P. H. T. Paulinetti
Suspenders..... C. O. Luce
Syringe..... F. C. Gndlach et al
Table spread support..... D. C. Jordan
Tanning..... W. H. Philippi
Tape into edgings. Machine for threading..... J. Davis
Target apparatus..... J. L. McCullough
Target. Signaling..... G. A. Wirt
Telegraph system. Wireless..... 2 pats.
Telephone. Coin controlled..... S. P. Grey
Telephone or telegraph pole..... I. M. Warner
Tidal motor..... E. B. Cade
Tile..... 3 pats.
Tile press..... A. L. Flood
Tiling..... W. P. Meeker
Tiling..... G. H. Bennett
Tire and manufacturing same. Elastic..... F. E. Hall
Tire. Pneumatic..... T. B. Jeffery
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Tobacco spinning machine. Chewing..... W. Schertiger
Tobacco stringing machine..... C. G. Wells
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Torpedo launching apparatus..... S. J. J. Drzewiecki
Toy building blocks, &c. Composition suitable for use in making..... J. Stephan
Toy cartridge exploder..... R. L. Short
Toy gun. Magazine..... I. T. Smith
Toy. Mechanical..... A. Honrath
Track sander..... W. C. Gardner
Transformer. Rotary..... A. Churchward
Trolley..... J. W. Brooks
Trolley harp or fork..... O. P. Johnson et al
Trolley wheel..... W. W. Annable
Truck..... G. H. Grondin et al
Truck lubricator. Car..... J. A. Bradford
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Tubes with wooden cores. Filling metal..... O. Steiner
Tunnel construction. Subaqueous..... J. F. O'Rourke
Turbine flue cleaner..... J. Prentice et al
Turbine. Steam..... R. B. Hewson
Type casting..... H. Barth
Type writer type bar and support..... C. Spiro
Type writing machine..... R. J. Fisher
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Valve. Automatic..... H. E. Stager
Valve for steam chests. Vertical left lubricating..... G. Wieseckel
Valve. Pop safety..... B. Hellwig
Vehicle..... N. P. Mader
Vehicle..... C. W. Hunt
Vehicle body raiser..... J. E. Cryderman
Vehicle brake..... J. A. Tauphaeus
Vehicle driving gear and brake combined. Motor..... H. H. Hennegin
Vehicle running gear..... W. N. Mecklan
Vehicle seat spring..... G. E. Blaine
Vending apparatus. Coin controlled..... O. Ashton
Veterinary appliance..... N. Stalker
Vise and bracket..... C. R. Harper
Wagon. Dumping..... R. J. Glenn
Wardrobe. Portable..... P. D. Graaff
Washing machine..... P. H. Gendron
Washing machine reversing mechanism..... D. B. Willock
Water closet..... F. A. Wells
Water meter..... G. B. Bassett
Water tower. Portable..... H. H. Gorter
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Watering trough, bowl, or basin..... N. W. Griswold
Wells, &c. Tool for oil..... W. J. Duulap
Whiffletree mounting..... E. W. M. Bailey
Windlass. Ship's..... C. W. Blake
Windmill..... T. W. Lowe
Window cleaner..... E. B. Beeler
Window fastener..... L. D. Parks
Window frame and sash..... C. L. Wall
Window guard. Bowed nursery..... G. C. & E. A. Williams
Window guard. Nursery..... G. C. & E. A. Williams
Window screen..... E. G. Holden

Wire grip..... J. D. Campbell et al
Wire stretcher..... F. C. Garton
Wire tightener..... S. W. Bradbury
Wiring wood slats. Machine for..... C. M. Alger
Woods. Staining..... J. Pfister
Woodwork. Decoration of..... H. Smith
Wrench..... M. Walsh et al
Wrench..... A. Dahl
Yoke. Neck..... A. Burk
Zinc furnace..... W. C. Wetherill
Zinc. Obtaining..... E. H. Hopkins

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Automobile body..... J. C. Reuter
Bag frame..... S. A. Keller
Candlestick..... 3 pats.
Fabric..... L. C. Hiller
Paper or draping weight..... W. F. Stifel
Spoons, forks, &c. Handle for..... A. Levaux
J. Clulue

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Acid and making same. Paramethyl amidophenylglyoxylic..... F. Ach
Aerated waters on draft. Apparatus for serving..... J. P. Jackson
Air cooling and purifying apparatus..... C. W. Vollmann
Alloy. Antifriction metal..... H. Pearce et al
Alumina from silica. Separating..... A. Kayser
Aluminum capable of being welded or soldered. Rendering..... C. P. Sorensen
Amalgam trap..... G. R. Tuttle
Amusement or roundabout apparatus..... G. W. Schofield
Animal trap..... S. Hetherington
Ash tray..... P. Kulicke
Automatic alarm..... J. F. Laird
Baby jumper..... G. J. Holton
Ball apparatus. Captive..... E. H. Miles
Banjo vellums. Drawing down device for..... W. J. Stent
Barrel making machinery..... J. Van Develde
Barrels. Machine for making veneer..... W. C. Grant
Basket forming and stapling machine..... N. E. Brown
Battery plates. Manufacturing secondary..... 2 pats.
Beam. Structural metal..... A. A. Strom
Bearing. Roller side..... J. C. Wands
Belt stud or fastener..... F. M. Linderman et al
Belt tightener..... W. E. Bee
Bevel and square..... A. C. Cullmann
Billiard cushion..... B. A. Stevens
Bleaching apparatus..... C. C. Clark
Blind. Window..... W. R. Briggs
Blotter or desk pad..... G. W. Buskirk
Blowing engine..... W. Kennedy
Boat. Submarine..... J. P. Holland
Bolt machine..... C. K. Lassiter
Bone black kiln..... W. T. Mohr
Boring and drilling machine..... B. E. Hervey
Bottle. Non refillable..... C. C. Guernsey
Bottle stopper..... M. Pitts
Bottle stopper..... M. C. Wilson
Bottles or jars. Metal cap for..... C. A. Calleson
Bowling alley..... C. J. Olson
Box..... E. T. Noble
Box covering machine..... C. B. Baldwin
Box fastening..... E. Fletcher
Brake mechanism..... D. S. Sebastian
Brake shoe..... J. D. Gallagher
Brick press..... J. J. Nieters
Buggy. Baby..... R. B. Coffman
Buggy boot attachment..... A. W. Wilson
Building block die..... N. Merley
Building renovating apparatus..... D. F. Saum
Buildings. Construction of metallic frame..... C. E. Hebbard
Button..... F. E. Stanley
Button..... J. Hilder
Button polishing machine..... J. Hornby
Calcium carbide. Manufacturing..... I. L. Roberts
Calipers. Micrometer..... J. T. Slocomb
Calk cutting machine..... F. E. Seagren
Camera..... H. W. Locke
Camera for producing and viewing images in natural colors. Photographic..... E. T. Butler
Can opener..... C. T. Custer
Cane unloading machine..... W. C. Gregg
Car coupling..... T. F. Melanson
Car coupling..... C. A. Tower
Car coupling..... B. O. Yearwood
Car coupling..... G. Westinghouse
Car door..... F. G. Susemihl
Car door. Flush..... K. Osel
Car fender..... E. C. Moulton
Car street indicator. Street..... J. F. Richardson
Cars. Device for connecting the electrical gear of electric..... A. Siemens
Cars. Emergency brake for tramway..... C. Real
Cars. Friction draft rigging for railway..... J. J. Hennessey
Carburetor..... F. Paul, Jr. et al
Carpet stretcher..... M. E. Shinn
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Carpet. Wood..... C. A. Stille et al
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Clock. Self winding..... C. Hour
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Coating metals preparatory to being heated..... H. Wachwitz
Cock and safety valve. Combined gage..... A. C. Calder
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Coins, &c. Receptacle for..... C. B. Pike
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 Hub. Vehicle..... E. B. Phillips
 Hub. Wheel..... H. N. Thayer
 Hydraulic press swinging table..... M. Wilkes
 Hydrocarbon burner..... E. Betz
 Hydrocarbon burner..... W. H. Stewart
 Ice cream dipper..... E. C. Baughman
 Incandescent light burner. Petroleum..... M. Bramson
 Inflatable wheel. Puncture proof..... A. Honrath
 Ink well..... S. G. Baldwin
 Iron bending machine. Angle..... W. Vollmer
 Iron bending machine. Flat..... W. Vollmer
 Jar cover..... R. W. Booth
 Knife, cutter, or dieing out instrument..... J. M. J. A. J., & S. A. Gimson
 Knitting machine..... M. Saldin
 Knitting machine..... H. Janssen

Label..... G. E. Howard
 Ladder..... C. B. Smith
 Ladder and truck therefor. Extension..... E. A. Herndon
 Lamp chimney protector..... W. C. Barress
 Lamp holders. Match safe attachment for miners..... J. A. Brown
 Last..... A. B. Taylor
 Liquid distributing or dosing tank and mechanism..... S. W. Miller
 Liquid receptacle..... W. Elkan
 Liquids with gases or gases with liquids. Apparatus for treating..... A. Vosmaer et al
 Liquors for kegs. Treating air for forcing malt..... C. A. Bartlett
 Loader and digger. Portable mechanical..... G. C. Brown
 Lock..... C. Kunzelmann
 Lock..... G. G. Smith
 Lock..... H. W. Eicher
 Locks. Gage for measuring keys for pin tumbler..... E. S. Phelps
 Locking device..... J. W. Gonce
 Locomotive..... J. H. Williams
 Locomotive boiler..... J. H. Williams
 Locomotive sand delivering pipe..... I. T. Lewis
 Loom for weaving pile fabrics..... A. F. McCollum
 Loom shedding mechanism..... 3 pats..... G. W. Stafford
 Loom shuttle binder..... F. A. Guillelte et al
 Loom. Weft replenishing..... H. I. Harriman
 Lubricator for elevator ropes, &c..... M. H. Halloran
 Magnesium. Making peroxid of..... F. Elias
 Mantle trimming mechanism..... J. T. Robin
 Marking machine..... F. J. Hagen
 Massaging device..... C. E. Mason
 Match boxing machine..... W. F. Hutchinson
 Match machine..... W. F. Hutchinson
 Match machine dipping roll..... J. P. Wright
 Measuring machine for rolled goods..... H. R. Meade
 Milk albumen. Producing soluble..... H. V. Dunham
 Miter box..... F. E. Abbott et al
 Mitten..... R. B. McMasters
 Monorailway..... E. A. Green
 Music sheet for automatic musical instruments. Perforated..... C. H. Shaw
 Music sheets. End fastener for perforated..... H. E. Beach
 Musical instrument. Electrical self playing..... H. E. Beach
 Nickel and copper nickel ores. Treatment of..... C. Perron
 Nickel. Melting..... H. L. Haas
 Numbering machine..... A. P. Waterman et al
 Nut lock..... G. H. Roberts, Sr
 Nut lock..... G. L. Pittman
 Nut lock..... S. C. Baughn, Jr
 Oil burner..... E. Stewart
 Oleaginous compound..... C. Adams
 Optical instrument..... S. A. Rhodes
 Ore leaching apparatus..... J. Brown
 Organ pipe. Compensating..... J. A. & W. McIntosh
 Ortho sulfonated toluyllic aldehyde and making same..... J. Koetschet
 Ozonizing apparatus..... A. Vosmaer
 Paper bag machine..... H. E. Westervelt
 Paper box..... H. S. Miller
 Paper machines. Wire cloth for..... R. Kron, Jr
 Paper making wire for paper making machines..... H. Parker
 Pen. Fountain..... R. B. Dickie
 Pen. Reservoir..... R. T. Gillespie
 Penholder..... E. M. Zeek
 Pencil case..... W. A. Leary
 Photographic exposure meter..... R. W. Whitney
 Photographic film..... C. H. Shaw
 Photographic shutter..... E. Donitz
 Picture mat cutting machine..... C. I. Shawver
 Pipe cleaning apparatus..... E. D. Case
 Pipe coupling. Train..... T. M. Henderson
 Pipe elbow blank..... E. H. Smith
 Pipe wrench..... E. A. Ware
 Planter. Check row corn..... J. Hillery
 Planter. Corn..... J. Barclay
 Planter. Seed..... J. M. Higbe
 Platen. Adjustable..... D. M. Lester
 Playing ball..... 2 pats..... E. Kempshall
 Plinth block. Metal..... J. J. Houlihan
 Plow..... J. P. Mulrony
 Plow. Reversible..... J. W. Glendy
 Polishing wheel..... F. G. Farnham
 Post for fencing, &c..... R. H. Guthrie
 Power. Generation of motive..... S. A. Rosenthal
 Power mechanism..... F. Clemens, Jr
 Preserving food products. 2 pats..... W. D. Baker
 Print making machine..... R. A. Bell
 Pulley. Sash cord..... P. Dosch
 Pump..... R. H. Yale
 Pump. Pneumatic..... R. W. Elliott
 Push rake..... H. Green
 Radiator for smoke pipes. Heat..... J. P. Schneller
 Rail joint..... L. Roth
 Railway signal..... 2 pats..... J. D. Price
 Railway signal. Electric..... C. D. Seaman
 Railway signal. Pneumatic..... C. S. Dean
 Railway stand pipe..... J. W. Thomas, Jr
 Railway. Suspension..... A. H. Mayhew
 Railway switch. Automatic..... G. E. Jones
 Railway switch. Electric..... J. A. Joyce
 Railway switch operating mechanism. Automatic..... L. Pierce
 Railway system. Electric..... L. E. Walkins
 Railway tie plate..... T. B. Modlin et al
 Railway tie plate..... V. E. McBee
 Railway track cattle guard..... H. L. Church
 Railway wagons, &c. Door for..... F. Barson
 Refrigerator..... N. Bosmann
 Rivet setting machine guide pocket..... E. Draper
 Rivet setting machine. Tubular..... T. S. Bennett
 Riveting machine..... G. E. Martin
 Road gate..... A. French
 Rock drill..... R. Avery
 Rock drilling engine..... J. G. Levner
 Rod coupling..... J. A. Fitzpatrick
 Roll mechanism..... C. H. Davis
 Roller mill..... W. A. Dunn
 Roller mill and cutter..... W. A. Dunn
 Rolling metal beams, channel beams, &c. Machine for..... 2 pats..... W. A. Dunn
 Rotary and folding chair..... J. A. Wilkinson
 Rotary engine..... T. D. J. C., & H. A. Prescott
 Rotary motor..... A. L. Becht
 Rotary shears..... G. W. Mudd
 Rotary steam engine..... J. W. K. Hodge
 Ruiling machine. Paper..... W. H. Jordan
 Safe. Screw door..... J. B. Boos
 Sand blast apparatus..... T. A. Sippel
 Sand blast controlling apparatus..... J. Shaver

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Sash fastener.....J. E. Gibbs
Saw setting machine.....J. E. Hillstrom
Saw tooth tool.....T. Olsen
Scale. Color.....C. J. Jorgensen
Scarf. Waterproof.....W. O. Chisholm
Sculpturing machine.....A. Bontempi
Seal. Bottle. 2 pats. (reissue).....E. D. Schmidt
Seed gatherer.....J. Pence
Sewing machine attachment for overedge or blind stitching.....E. Donaldson
Sewing machine feeding mechanism.....J. V. Eves
Sewing machine needle controlling mechanism.....J. V. Eves
Sewing machine presser foot and needle bar lifting mechanism combined.....E. G. O'Donnell
Sheet metal can.....F. Tyson
Shovel support.....J. Baker
Show case.....W. Kinzy
Sifter. Ash.....E. Wilcox
Sign.....J. Lorch, Jr
Sign illuminating device. Street.....J. Lieber, Jr
Signal and engine driver recorder.....J. P. de Braam
Slag heating apparatus.....J. A. Potter
Soap holder.....A. E. Dusek
Spinning band.....G. M. Beadle
Spinning machine shell rolls.....A. G. Booser
Spring wheel.....J. Dicaire
Sputum receptacle and holder. Aseptic.....C. M. Langhorne
Stamp affixer.....H. D. Long et al
Stamp mill mortar.....W. A. Merralls
Station indicator.....J. S. Anderson
Steam boiler.....C. Olson
Steam engine.....M. J. Verret et al
Steam generator.....P. Stoltz
Steam generator of the locomotive type.....H. Plowman
Steam generator or water heater.....B. A. Geurink
Steam generator or water heater.....C. M. Raymond
Steam trap.....J. Campbell
Steam trap.....J. Morehead
Stereotype. Asbestos.....L. Elias
Stereotyping matrix.....J. E. Weigl
Still. Turpentine.....J. T. Gilmer
Stocking supporter.....E. H. Waterman
Stove pipe holder or collar.....J. E. Faulkner
Strabismus. Device for the cure of.....J. E. Stierle
Stretcher or cot. Folding.....J. H. Koons
Surgical instrument.....R. H. Simpson
Surveying instrument.....T. T. Ferguson
Suture clamp.....H. Brown
Sweetmeat machine.....W. L. White
Swing.....W. C. Tattle
Swing. Lawn or house.....O. R. Olson
Switch operating device.....J. & F. Stupar
Switch throwing device.....U. F. Beeghly
Table and ironing board. Combination.....P. Rothenbusch
Tank construction.....E. D. Chester
Telegraph. Facsimile.....E. E. Kleinschmidt
Telegraphy and telephony. Apparatus for composite systems of simultaneous.....J. M. Fell
Telephone call annunciator.....Z. E. Jackson
Telephone switch.....C. B. McPherson
Telephone system. reissue.....F. W. Dunbar
Tin plate cleaning machine.....J. C. Talliaferro et al
Tire. Bicycle.....H. D. Lefferts
Tire. Pneumatic.....J. Tennant
Tire. Vehicle wheel.....M. C. Carter
Tool construction. Machine.....W. H. Baush
Toothpick drying machine.....C. F. Scamman
Toothpick forming and drying machine.....C. F. Scamman
Torpedo firing apparatus. Pneumatic.....S. Lake
Toy biograph.....W. Maxwell
Transits. Meridian attachment for solar.....J. H. Young
Transmitting mechanism.....C. W. Hunt
Trolley.....F. A. Merrick
Trolley guard.....E. Gagne
Trolley pole.....W. Pullman et al
Truck bearing. Adjustable.....W. S. Adams
Truck. Car.....J. A. Brill
Truck. Car.....W. S. Adams
Truck construction. Car.....W. S. Adams
Truck. Elevating.....A. A. Scott
Truck. Street car.....R. H. Hornbrook et al
Type writer.....W. Hunt
Type writer type holder.....I. H. Mallin
Type writing machine.....J. Felbel
Type writing machine card or sheet platen.....R. J. Fisher
Valve.....J. H. Bickford
Valve. Engineer's brake.....H. R. Mason
Valve. Fluid pressure engine.....P. T. Stillman
Valve for pumps, &c.....T. A. MacDonald
Valve mechanism for fluid supply pipes.....A. S. Yieffer
Valve. One way.....E. H. Gold
Valve. Straightway.....E. M. Erdman
Vehicle body spring suspension.....F. Corssen
Vehicle brake mechanism. Motor.....J. Unser
Vehicle gear.....3 pats.....F. E. Wilcox
Vehicle seat brace.....G. W. Vinson
Vehicle single perch gear.....F. E. Wilcox
Ventilator.....J. W. Maus
Ventral protector.....W. M. & J. M. Sausser
Vise.....W. E. Suediker
Vise.....J. F. Emmert
Wagon. Dumping.....J. J. Eagen
Wall finish and making same.....G. W. Wodicka
Washing machine.....M. E. Kelly
Watch movement fastener.....L. G. Solenberger
Watch. Stem winding.....M. Bassoff
Watch. Stop.....M. Bassoff
Water gage connection.....J. B. L. McKenzie
Water gate.....J. H. Martin et al
Water heater.....R. J. Gibbons
Water heater. Wall.....J. H. Mackley
Water motor.....N. Schmidt
Wax. Prepared sealing.....T. Ardizone
Weaner. Calf.....D. Daggett
Window and window frame. Metal.....W. R. Mudd
Window screen.....H. D. Mills
Window screen.....E. Hipolito
Wood bending.....S. Clark
Wool washing machine.....J. Keefe

DESIGNS.

Braid.....M. Miettendorff
Buttoner handle.....M. A. Hill
Chataleine bag side frame.....L. Wolf
Fabric.....A. Pfander
Lamp chimney canopy.....A. P. Storrs
Soap.....C. A. Cray
Stove front. Gas.....E. B. Adler

Accordion.....J. Golob
Adding machine.....E. Fitch
Adhesive.....A. S. Hoyt
Advertising device.....W. D. Butt
Air compressing apparatus.....E. J. St. Croix
Air compressor.....W. J. Stevens
Air cooling and filtering apparatus. Compressed.....F. Grumbacher
Alloys. Manufacture of.....G. F. Jaubert
Ammonia generator.....J. A. Young
Ammunition from the ammunition carriage in to the loading axis of the gun. Apparatus for transferring.....J. Krone
Arch construction. Concrete.....W. C. Parmley
Automobile steering device.....G. R. Schlumberger
Axle spindle take up device.....J. J. Cook
Bandage.....C. J. Higgins
Batteries. Means for controlling the charging of secondary.....J. Barry
Beam clamp.....H. S. Collins
Bean separator.....W. F. Pillmore et al
Bearing. Axle.....R. McLaughlin
Bearing. Spindle.....J. Kilburn
Bedstead. Metal.....J. A. Mollitor
Beer. Apparatus for cleaning cellular tissues used in clarifying.....C. Spindler
Beer. Manufacturing non alcoholic.....V. Lapp
Beet toppler.....M. W. Palmer
Bevel.....D. E. Hughes
Bicycle.....C. H. Ocumpaugh
Bicycle. Chainless.....F. Booth
Bicycle frame.....R. F. Monahan
Blowpipe. Gas.....G. B. Snow
Boards. Machine for forming blanks from matched.....C. Johnson
Boiler furnace.....A. Muir
Boiler tube cutter.....J. H. Pollard
Book cover. Memorandum.....M. Vernon
Book leaf.....C. H. Wheaton
Bookbinding sheet.....G. Hager
Bookkeeping.....C. Seitz
Bottle riuser.....H. W. Colby et al
Bottle stopper.....J. T. Hicks
Bowling alley.....H. J. Shipham
Box or carton blanks. Mechanism for removing salvage from.....J. Meek
Brander. Electric.....H. L. Jenkins et al
Bread cutter.....W. O. N. Morrison
Bridle bit.....C. W. Drown
Brooder. Chicken.....N. Pedersen
Brush.....J. Schreiner
Buggy boot.....J. W. Simmons
Button. Wire.....S. A. Foster
Camera. Folding stereoscopic.....C. P. Goerz
Camera stand. Adjustable.....J. H. Smith
Cane. Magazine torpedo.....J. B. Allen
Cans. Measuring and discharging apparatus for filling.....J. McGinnity
Car axles. Means for driving generators by.....J. L. Creveling
Car center bearing. Railway.....F. Ditchfield
Car coupling.....A. B. Carter
Car coupling.....W. T. Seaton et al
Car end panel and seat post. Open.....J. Seiberger
Car grain door.....J. A. Hoerr
Car haul.....A. M. Acklin
Car mover.....H. C. Harrington et al
Car seat ticket holder.....G. H. Roberts, Sr
Car seats and seat post with which it connects. End panel for open.....J. Seiberger
Car. Stock.....W. Clue
Car uncoupling. Means.....G. Groobey
Car uncoupling mechanism. Railway.....G. Groobey
Car uncoupling mechanism. Railway.....G. Groobey et al
Cars. Pivoted rocker bearing center plate for railway.....C. M. Thompson
Carborundum articles and making same.....F. J. Tone
Carbureter.....A. M. Rosenberry
Carbureter.....T. J. Forde
Cart or wagon. Dumping.....W. Leonhardt
Casting big metal. Mold coating for apparatus for.....J. M. Hartman
Cement. Adhesive.....J. T. Sibugh
Change making machine.....P. H. Stedman
Check perforating machine.....F. Avery
Check perforator.....M. Keane
Checkrein hook.....J. P. Ketteringham
Chenille spotting.....L. O. Trivett et al
Chilian mill.....J. F. Waddell et al
Churn.....A. A. Mitchell
Clute. Adjustable loading.....L. Rosefeld
Cigarette machines. Device for feeding tobacco in.....J. Paul
Clasp or fastener.....N. Crane
Clock. Electric.....N. Harrison
Clock pendulum regulator.....J. Butcher
Clothes wringer.....E. B. Gay
Clutch.....P. A. Houghtaling
Clutch operating mechanism.....E. Turney
Coaster brake.....G. Glover
Cocoanut cutting machine.....F. Baker, Jr. et al
Coin case.....B. B. Anderson
Compasses.....C. Brandell
Concentrator.....J. A. Holmes et al
Conduit.....W. L. McGowan
Conduit rod coupling.....J. F. Greaves
Conveyer.....M. Bradfield
Cooking cabinet.....H. Faschian
Cork fastener.....R. Biezinger
Corst stiffener.....H. Torley
Crate. Folding.....C. W. Heller et al
Creel for selva spools on slashers.....D. M. Sullivan
Curtain fixture and curtain support. Combined.....C. B. Jacoby
Cycle motor attachment.....2 pats.....L. M. Meyrick-Jones
Cycle rest.....H. U. Von Troschke
Dental gage.....C. R. Vanderpool
Dental mouth mirror.....G. S. Bennett et al
Dice cup.....H. L. Haskell
Display box.....B. Budweiser
Drafting plotter.....R. L. Botts
Draw off or stretching rollers for textile machinery.....A. Bietenholz
Dredge. Mining.....H. J. Barton et al
Drying chambers. Apparatus for carrying goods through.....J. Keith et al
Drill press.....A. Vik
Dynamo and driving gear. Combined.....J. L. Creveling

Eggs. Preserving.....W. Schoning
Electric wire pole.....B. McFarren
Electrical indicator.....H. S. Tittle
Electrical translating devices. Controlling the energy delivered to.....H. W. Leonard
Elevator.....C. L. Baldwin et al
Elevator safety device.....A. W. Leach
Enameled metal plates. Manufacture of.....D. Wieser
Engines. Electric igniter for explosive.....H. A. Gray
Envelope.....F. R. Stearns et al
Eraser. Blackboard.....F. C. Raber
Eyeglasses.....R. B. Finch
Eyeglasses.....E. H. Schild
Feather fabric. Woven.....3 pats.....E. K. Warren et al
Fence post.....C. O. Blee et al
Fence post.....I. M. Warner
Fence post. Metallic.....J. A. Utter
Fences. Machine for weaving cross wires in.....W. Groves et al
File.....G. H. Kravik
File for papers and documents.....G. E. Schmidmer
Filing receptacles, &c. Locking device for.....2 pats.....D. E. Wright
Filter.....J. Kostalek
Fire doors, &c. Electrical releaser for.....H. J. Podlesak
Fire escape.....J. W. Smith
Flask.....E. Weidenbaker
Fodder loader.....C. L. Packer
Folding chair. Adjustable.....F. Vogel
Fruit brushing and cleaning machine.....M. G. Swan et al
Fruit grader.....F. Stebler
Fuel. Artificial.....C. B. Harris
Game apparatus.....H. A. Hannum
Game board.....2 pats.....H. L. Haskell
Game board.....A. Assorati
Garbage, &c. Apparatus for the treatment of.....R. Thorne
Garbage cooking apparatus.....C. S. Wheelwright
Gas generator.....C. J. Luther
Gas generator. Acetylene.....J. C. Charbeau
Gas heating burner. Atmospheric.....J. J. Lawler
Gas purifying apparatus.....H. A. Humphrey
Gases. Apparatus for mixing.....A. Molet
Gases. Treating.....E. Theisen
Gasolene regulator.....C. J. Johnson
Gate.....T. A. Hill
Gate.....J. Meyer
Gear. Variable speed and reversing.....H. J. Westover
Gib and key device.....C. B. Post
Glass article. Making hollow.....D. C. Ripley
Glass, &c. Framing.....H. W. Scattergood
Glass melting machine.....J. C. Triance
Glass shaping apparatus.....D. C. Ripley
Glassware. Apparatus for the manufacture of.....D. C. Ripley
Glove.....B. N. Carson
Gold or silver ores. Apparatus for treating pulverized.....D. C. Boley
Governor. Steam engine.....R. J. Patterson
Grain drill.....W. F. Hoyt
Grain drill.....W. F. Hoyt et al
Grain drill.....G. H. Burrill
Graen drill tube.....L. J. Sanker et al
Grapple.....A. Dailey et al
Grinding or crushing head or roll.....V. W. Mason, Jr
Gun cleaner.....E. A. Pugh
Hame hook.....G. F. Lindsay
Hammer. Drop.....L. D. Howard
Hammer. Power.....C. H. Krebbel
Hammer. Power.....J. H. Jackson
Harrow draw bar.....A. O. Hoepner
Harrow. Folding.....A. T. Upton
Hat brim stretcher.....E. J. Mellen
Hatter's hair strainer.....M. R. Foster, Jr
Hay rake and loader.....E. D. Doney
Heat bath. Radiant.....G. Brueck
Hinge knob.....H. J. Valentine
Hitching device.....A. H. Debord
Hoister and conveyer.....G. W. Menefee
Hoisting hook.....S. Cowan
Hose supporter. Lady's.....L. A. Negral
Hydrocarbon burner.....L. K. Leahy
Ice run.....H. D. Simpson
Illusion apparatus.....W. L. Hall
Implement seat.....J. G. Wangerin
Incubator.....O. P. Scott
Index systems, &c. Locking mechanism for card.....D. E. Wright
Induction coil.....J. O. Heinze, Jr
Insect destroying compound.....J. H. Lester
Iron. Producing.....O. Thiel
Knitted fabric.....D. C. Bellis
Knitted fabric.....2 pats.....R. W. Scott
Knitted fabric.....2 pats.....L. N. D. Williams
Knitted fabric. Ribbed.....2 pats.....R. W. Scott
Knitting machine.....L. N. D. Williams
Knitting machine bar wheel support.....B. A. Stewart
Knitting machine. Rib.....R. W. Scott
Labeling machine. Cau.....F. C. Morrison
Lacing hook for women's shoes, &c.....N. H. Clark
Lamp and lantern. Combined.....F. B. Waibel
Lamp hanger. Adjustable electric.....H. G. Breitwieser
Land roller.....A. Yoost
Lath.....C. Garber
Lever mechanism.....M. J. Todd
Liquid dispersing or spray making apparatus.....C. H. Prott
Liquid fuel spraying and burning apparatus.....A. Kohler
Loom. Kindergarten.....L. M. Comstock
Loom take up mechanism.....G. Schmidt, Sr
Lubricating pad grapple.....J. Loesewitz
Lumber. Making artificial.....W. S. Huntington
Magnetic wheel.....J. O. Heinze, Jr
Malt houses. Apparatus for conveying grain in.....W. P. Rice
Manifold duplicating device.....H. H. Norrington
Match boxes, &c. Apparatus for applying the preparation to striking surfaces of.....S. E. Pasfield
Measuring device.....E. Hill
Measuring device. Shoemaker's.....T. C. Graft
Meat, &c. Machine for cutting.....F. Coff
Meat reducing device.....H. C. Chambers
Mechanical motor.....R. K. McLellan
Mechanical motor.....H. S. Durand
Merrygo round.....E. Bollinger
Metal bending machine.....2 pats.....F. Ditchfield
Metal cutting tool holder.....F. W. Taylor et al

Metallic tie.....W. W. Fike
Milk and cream. Acid mixer for facilitating the testing of.....M. D. Beach
Milking shield.....H. H. Kagey
Molders' chaplets. Apparatus for the manufacture of.....R. B. Haskins
Money changer. Mechanical.....G. W. Castlen
Money holder or envelop. Folding.....E. L. Miller
Mop wringer.....J. C. Thomson
Mosquito canopy.....M. E. Webber
Music leaf turner.....J. Ahern
Necktie.....C. Reynoldt
Nut lock.....T. Lynch
Oar lock guard.....H. Ditchburn
Oil burner.....J. P. Simonsen
Ophthalmoscope.....E. B. Meyrowitz
Optical appliance. Electrically controlled.....W. B. Wheeler
Optical instrument. Educational.....G. W. McFatrach
Ordnance. Firing pin arrangement for breech-loading.....G. Ehrhardt
Ore crushing machine.....C. C. Lane
Ores and by products containing sulfur and iron. Treating.....A. W. Chase
Ores. Electrolytically treating.....C. E. Dolbear
Packing. Stuffing box.....P. Redford
Paper clip.....S. R. Stratton
Paper machine. Lace.....J. R. Thompson
Paper tube refolding machine.....3 pats.....H. S. Munson
Pea sheller.....L. A. Aspinwall
Peat for fuel purposes. Preparing bog.....A. Charon
Pens. Filling or refilling fountain.....R. H. Ashcroft
Perfect combustion furnace.....W. N. Best
Perforating machine.....E. A. Trussell
Pessary.....C. J. Hollweg
Photograph burnisher.....C. J. Dolicus
Photographic shutter mechanism.....C. A. Muller
Piano forte action.....G. M. Guild
Ping pong table net support.....A. Ek
Pipe coupling.....A. M. Kidd et al
Pipe hanger.....H. S. Collins
Planter and fertilizer distributor. Combined seed.....E. G. Henry
Planter. Potato.....L. A. Aspinwall
Plow. Cultivating.....A. Horner
Plow wing attachment.....G. H. McGuire
Pocket.....R. Bartell
Poke. Animal.....H. E. Downing
Potassium cyanate. Producing.....S. Zuckschwerdt
Potato digger.....L. A. Aspinwall
Potato sorter.....L. A. Aspinwall
Pouch.....J. A. Smithline et al
Power transmitting machinery.....E. Winans
Preserving frozen food products.....D. W. Davis
Printing device.....W. L. Morris
Printing machine.....W. Scott
Printing machine.....F. J. Wende et al
Projectile or shell for ordnance. Explosive.....C. Puff
Projectiles. Hardening.....R. A. Hadfield
Propeller.....D. Selkirk
Pump. Automatic siphon.....A. Bruzek
Pump. Rotary force.....S. M. Frank
Radiator.....A. Eichhorn
Rail joint.....J. W. Elzea
Railway carriages. Safety outlet in longitudinal walls of.....D. Erdelbrock
Railway cross tie and chair. Combined.....S. Love
Railway danger signal device.....F. G. Chamberlin
Railway signaling apparatus.....E. Rowe
Railway switch. Electrically operated.....J. Loney
Railway tie.....J. L. Grieb
Railway track laying machine.....H. Mann
Refrigerating apparatus.....C. J. Coleman
Rein holder.....T. L. Thompson
Rein holder.....W. P. Sampson
Rotary drier.....L. Grill
Rotary engine.....S. J. Webb
Rotary engine.....B. W. Fellows
Rotary engine.....O. C. Jones
Rule. Drafting.....M. C. Kelley
Sash lock.....W. Bennett
Sash weights. Flask for making seamless.....A. S. Hodges
Sashes. Automatic releasing device for window.....C. Rupp
Sawmill log reflector.....W. T. S. Diggins
Saw. Power driven.....W. D. Lloyd
Screw driver.....J. F. Larsen
Seal.....E. J. Brooks
Seal. Dress pattern.....J. Broach et al
Seal lock.....J. P. Kernbaum
Sealing machine. Envelop.....H. E. Gavitt
Secondary battery.....W. L. Silvey
Seed cake trimmer.....S. J. Ellis et al
Seed cleaner and grain separator.....B. F. Hatfield
Seeding machine.....F. E. Davis
Sewing machine thread controlling device.....E. B. Allen
Shade fixture. Window.....C. I. Wimmer
Sharpener. Shears.....K. Rossler
Shearing tool or clipper.....J. K. Stewart
Shears.....S. N. Fortney
Shift key actuating device.....R. S. Cope
Show case.....S. Himmel
Sifter. Cinder.....H. Maynard
Signaling apparatus. Train.....W. D. Clopton
Silk. Intensifying the luster of.....C. Stuart
Skirt elevator.....C. W. L. Barber
Skirt holder or skirt suspender.....W. Mehlfeld
Sodium peroxid. Compressing.....G. F. Jaubert
Spinning ring truing mechanism.....C. F. Roper
Square. Try.....P. E. Eilenberger
Steam engine.....A. P. Moresi et al
Steam. Superheating.....H. Webster
Stone board. Artificial.....A. McDougall
Stones. Molding box for the manufacture of building.....E. Levi
Stove. Heating.....2 pats.....L. W. Hemp
Stovepipe attachment.....J. C. Hoyt
Stovepipe ventilator.....F. E. Taft
Sulfur from sulfid ores. Eliminating the.....A. Gutensohn
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Telephone exchange system and apparatus. Automatic.....A. M. Bullard et al

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Washing machine..... A. G. Brandt et al
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Wells, &c. Sucker rod grab for oil..... W. La Barte
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Window frame and sash..... E. Davey
Window frame and sash. Sheet metal..... C. B. Schilling
Wire. Combination tool for manipulating..... E. C. Cullen
Wires. Metal fastening for cross. B. S. Blake
Wood fiber. Machine for producing..... H. M. Hoover
Wood. Impregnating..... M. Ruping
Wrench..... R. Johns
Wrench..... C. Busby

DESIGNS.

Stove..... M. Magen
Toy stove..... C. A. Bailey

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MECHANICAL PATENTS.

Advertising display device..... D. Jones
Aeroplane..... T. Gibon
Alkaline salts. Electrolytic decomposition of..... E. Edser et al
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Aquatic animals. Apparatus for transporting live..... M. Kern et al
Auriphone..... F. I. Gano
Automatic brake..... (reissue) A. E. Norris
Automobile..... H. Lemp
Awning..... B. T. Lamb et al
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Balls. Manufacture of playing..... F. H. Richards
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Banana shipping case..... H. Bitner
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Bean cleaning machine..... G. R. Davidson
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Bed bottom..... E. Rose et al
Bed. Folding..... C. M. Hamilton
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Bevel..... C. Bodmer
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Bottle. Non-refillable..... H. Breunig et al
Bottle. Non-refillable..... J. W. Edwards
Bottle. Siphon..... E. Scheiber et al
Bottle stopper..... A. E. Snow
Bottle stopper. Water..... 2 pats..... E. Phillipson
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Box or crate..... W. H. Rogers
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Gate..... (reissue) I. L. Landis
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Gun. Magazine..... J. M. Browning
Gun. Rapid fire..... V. P. De Knight
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Lock..... W. R. Paige et al
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Loom let off arresting mechanism..... E. S. Stimpson

(Continued in November Number.)

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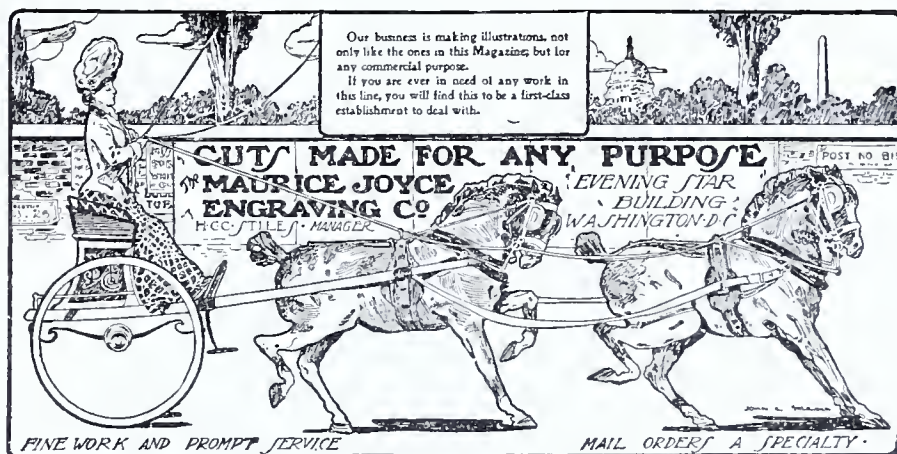
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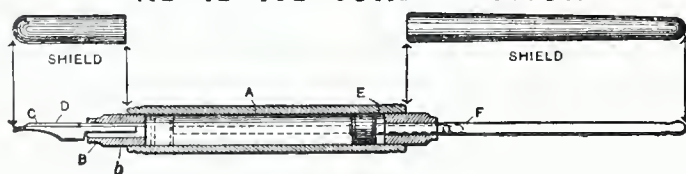


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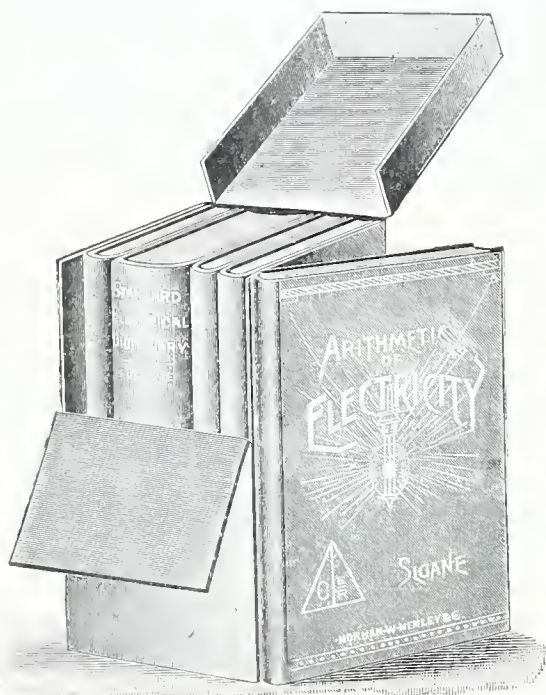
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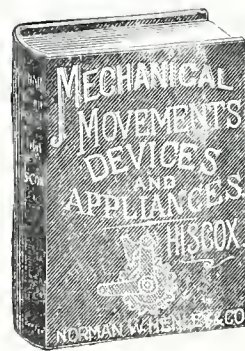
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Fourteenth Year. {
No. 11.

WASHINGTON, D. C.--NOVEMBER, 1902.

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☼ EXPOSITION. ☼

THE "paper work" or planning of the main picture of the Louisiana Purchase Exposition, is now practically completed. The main picture is the composition which fills the northern section of the Forest Park portion of the fair site. Here is a surface as level as is consistent with proper drainage, closed on the southern side by hills that rise to a height of about 65 feet. The component parts of this picture are the cascades and the cascade gardens, ten big exhibit buildings of various sizes and shapes, about two miles of basin lagoon and canal, and about five miles of street and avenue.

Of the ten exhibit buildings to be put up on this area most are under contract and have attained various stages of completion. The accompanying items tell the story of the buildings in the main exhibit group:

Varied Industries Building, 525 x 1,200 feet, cost \$645,000; Van Brunt & Howe, of Kansas City, architects; Roundtree Construction Company, contractor.

Liberal Arts Building, 600 x 525 feet: cost \$335,000; Eames & Young, of St. Louis, architects; John J. Dunhavant & Company, contractor.

Electricity Building, 600 x 525 feet: cost \$415,000; Walker & Kimball of Boston and Omaha, architects; Goldie Construction Company, contractor.

Machinery Building, 525 x 800 feet: cost \$510,000; Wildmann, Walsh & Beisselier, of St. Louis, architects; Smith & Eastman, contractors.

Education and Social Economy Building, 525 x 750 feet: cost \$480,000; Barnett, Hayes & Barnett, of St. Louis, architects; Kellermann Contracting Company, contractor.

Art Building, 750 x 425 feet: cost \$945,127.50; Cass Gilbert, of St. Paul and New York, architects; Goldie Construction Company, contractor.

Mines and Metallurgy Building, 525 x 750 feet: cost \$502,000; Theodore C. Link, of St. Louis, architect; Hill—O'Meara Construction Co., contractor.

Manufactures Building, 525 x 1,200 feet: cost \$719,399; Carrere & Hastings, of New York, architects.

Transportation Building, 525 x 1,300 feet: Division of Works Designers, architects.

Government Building, 850 x 200 feet; J. Knox Taylor, of Washington, D. C., architect: let in two contracts.

Not only those buildings in the main picture, but also those which are located outside of the Forest Park portion of the site have advanced far. They are:

Horticulture Building, 800 x 300 feet: Division of Works Designers, architects.

Agriculture Building, 1600 x 500 feet; Division of Works Designers, architects.

The Mines and Metallurgy Building forms part of the east wing of the fan-like general ground plan of the Exposition, and is the last building on the south side of the esplanade leading to the group of Government Buildings, which are to stand on a higher level. It will have a rich back-ground of hill-side foliage toward the south-east. Considered as part of the general scheme,

it plays a very unimportant role in the spectacular display of the Fair, and for this reason no attempt has been made to force attention to it by such means as towers, domes, or similar architectural devices.

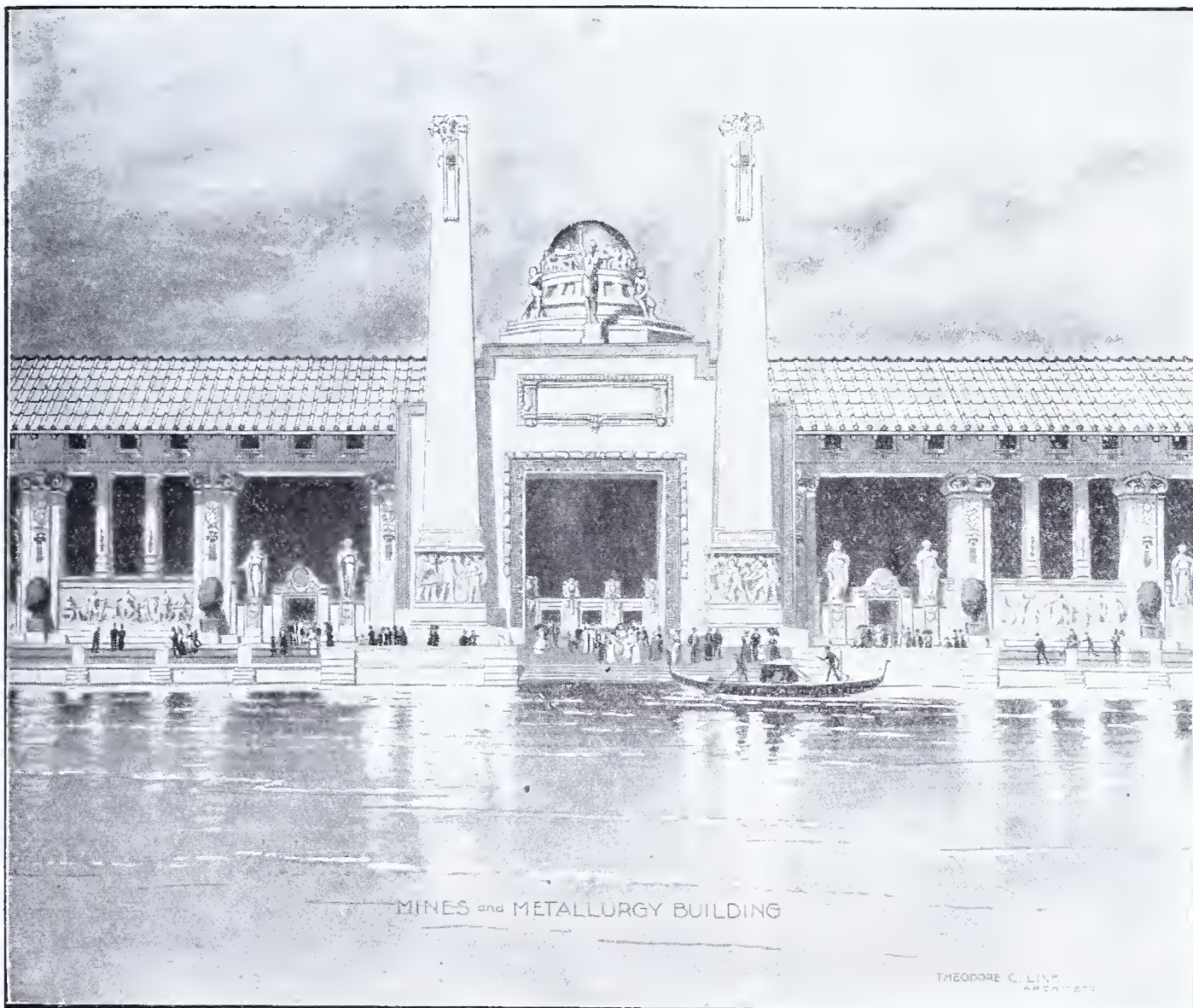
The outside dimensions are 525 x 750 feet. The building is divided into eight oblong parts almost equal in area. The division is accomplished with glass covered and ventilated arcades, from 30 to 50 feet wide, which makes it possible that each one of the eight divisions shall receive abundant light from every side, and that no skylights shall be necessary directly over any of the exhibition spaces. At the intersection of the two principal arcades through the main axis a colonnaded rotunda is shown with an appropriate monument.

The ground floor will furnish an exhibition space of about 265,000 square feet and about 150,000 square feet may

be gained by the introduction of galleries. A sub-division of the exhibit space into numerous alcoves for each classification is suggested.

The walls of the building are set back from the facade 18 or 20 feet, forming a covered loggia which surrounds the entire building.

The facade of the Mines and Metallurgy Building may be likened to a screen bearing the same relation to this structure as do the colonnades of the adjoining



MINES AND METALLURGY BUILDING.

THEODORE C. LINK
ARCHT.

buildings to their structures.

The base of this screen consists of sculptured panels illustrating, in bold relief mining and metallurgical operations in symbolical representations, the back-ground to the sculptured figures being of a rough golden colored glass which will be illuminated at night and show the figures in silhouette. The figures are more than life size. As a building for housing Exposition exhibits, it was argued that it should express externally as much friendly dignity as would be compatible with its ephemeral character: that it would be incongruous, however, to disguise its ephemeral character by the garb of severe and classic forms which we associate with the most lasting architectural monuments of antiquity: and that, furthermore—being a part of the greatest “show” ever attempted—it undoubtedly should be novel, striking and full of life.

The style of architecture which it represents has been a source of much speculation.

“Some have attempted to classify it as an example of the ‘nouveau art’” says Mr. Theodore C. Link, the architect of the building, “but when I recently noticed an English art critic say, in protesting against its invasion of Great Britain, that this ‘nouveau art’ is ‘a malady, the pernicious virus of which becomes more acute the farther it travels,’ I feel a strong personal solicitude for a properly conducted baptismal ceremony.

“Let us, therefore, name it Secession Architecture. Perhaps I will have to explain what Secession Architecture is, if the name should not make it quite clear. It means architectural liberty and emancipation with a strong plea for individuality. It is a breaking away from conventionality in design: it is more an architecture of feeling than of formula.”

Entry of Trademarks at Custom House Offices.

Manufacturers and others who own valuable trademarks, should give heed to the contents of the circular from the Treasury Department, which is as follows:

“Applications for the recording of names or trademarks in the Treasury Department, will state the name and residence of the domestic manufacturer, and furnish a description of the mark and the names of the ports to which the fac-similes should be sent. No such name or trademark will be received unless accompanied by the proper proof of ownership, and proof that the owner is a domestic manufacturer, which must consist of the affidavit of the owner or one of the owners, certified by a Notary Public, or other officer entitled to administer oaths and having a seal. On the receipt by a custom officer of any such fac-similes, with information from the Department that they have been recorded therein, he will properly record and file them, and will exercise care to prevent the entry at the custom house of any article of foreign manufacture copying or simulating such mark. No fees are charged for recording trademarks in the Department and custom houses. A sufficient number of fac-similes should be forwarded to enable the Department to send one copy to each port named in the application, with an additional copy for the files of the Department. Circular No. 22, Feb. 5, 1896.”

By following the course suggested in this circular, the infringement of valu-

able trademark rights may be stopped before it has injured the trade of American manufacturers. It very frequently happens that foreign manufacturers ship goods to the United States with trademarks thereon which simulate the marks of American manufacturers, and this fact does not become known to the manufacturers until many months, if not years have elapsed and great damage done. If the course suggested by the Treasury Department is followed, the custom house officials of the Department can refuse admission of any goods containing marks thereon which infringe American marks. This can be done without resorting to the courts for protection.

New Life-Saving Boat.

Captain Doenvig, of Horten, Norway, has lately made a trial of a newly invented lifeboat, the result of which seems very satisfactory.

Some years ago the inventor, Captain Doenvig, was in a shipwreck on the coast of Virginia, which bereft him of his family, and ever since he has been deeply interested in the construction of a lifeboat which may be serviceable under all circumstances.

The trial was made in presence of representatives of the press, the navy, and the merchant marine. Experts claim for the new invention that it will safely carry its load of human beings through any storm. Below is given a short description of this boat, which may prove of importance to seafaring people all over the world.

The apparatus, or buoy, is round as a globe, only a little flattened at the bottom. It is made from solid sheet iron of the following thicknesses: at the bottom five-sixteenths of an inch, on the sides three-sixteenths of an inch, and at the top one-eighth of an inch. The diameter of the buoy is 8 feet: the height 6½ feet. The buoy has a double bottom and draws 2½ feet of water when loaded. The inside of the buoy is entered through three water-tight trapdoors.

Under the deck, which is located about 1 foot below the water line, are placed 4 galvanized tanks, with capacity for holding about 140 gallons of fresh water. Alongside the wall runs a low bench to sit on, and the space underneath it is to be filled with canned goods. In the center of the inner room is a funnel that can be shoved up, thus letting fresh air into the buoy. In the top are three small windows, partly for the purpose of letting in light, but also for use in sending up rockets. The buoy is provided with a movable keel which can be let down from the inside: also with a rudder which can be applied in the same manner. Assisted by small oars, which are kept inside, the buoy can be propelled to land in fair weather. On the outside of the buoy is a cork belt, on which the men may stand and row. Further, the buoy is supplied with an anchor and 100 feet of steel rope and with sails, the air funnel serving as mast.

There is no danger that this lifeboat will get dashed to pieces when departing from the sinking ship, as it may simply remain on board until the ship sinks, and it will then float up. The cost of the buoy will be about \$500, its weight about two tons, or practically the same as that of a large lifeboat, and it will have accommodations for twenty persons. It is also claimed that this new lifeboat will require far less deck space on board ship than the ordinary lifeboats.

Electricity in Ore Handling.

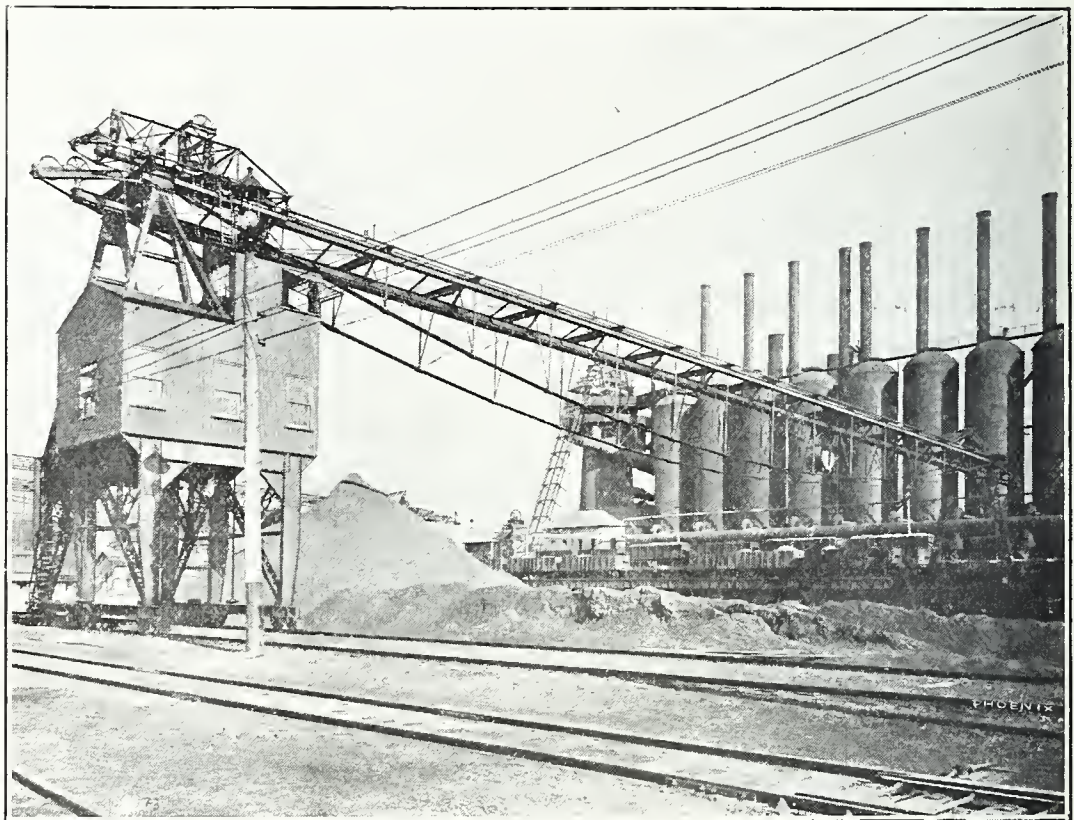
By WALDON FAWCETT.

THE extent of the present use of electric power in iron and steel making and working plants and manufacturing establishments in general, indicates that it is likely to become the preeminent motive force of the future for such utilization. In many factories where there is a considerable loss of power in the friction of shafting and belting, experts have estimated that such loss aggregates from 40 to 75 per cent of the total power required for the work, and it is claimed that a proportionate economy may be secured in the various transfers of material entailed in iron and steel manufacture.

The great factor in favor of electric power is found, of course, in the fact that when electrically-driven apparatus is stopped, the power loss or expenditure ceases entirely. This is true, it is claimed, of no other system of transmission. Furthermore, with the

of this form of machine is found at some of the furnace plants in the Pittsburgh district. A representative installation is that of the Duquesne furnaces of the Carnegie Steel Company. The apparatus is a modification of the bridge tramway in use in transferring ore from the holds of vessels or stock piles, or railroad cars, at the lower lake ports. The furnace tramway, which is in effect a gantry crane, is so arranged that it serves not only the storage yard but the furnaces themselves. In other words, the raw material arriving at the plant by rail may at the single operation, be transferred either to the stock piles or direct to the blast furnaces.

The Duquesne plant of the Carnegie Company, operated, of course, by electric motors, serves a storage space 233 feet in width; and five ton capacity tubs are used in taking the ore from



ORE BRIDGE AT DUQUESNE FURNACES OF THE CARNEGIE STEEL COMPANY.
(Courtesy of American Manufacturer.)

electrical system, any portion of machinery installation may be operated irrespective of the other portions. One of the best endorsements for electrical power, as applied in iron and steel working institutions, is found in the fact that in many instances it has either supplanted steam or been introduced in the latest machinery installations, even where steam has been retained as the motive force of those installed earlier. A case in point is found at the plant of the Newport News Ship Building & Dry Dock Company, where the cantilever cranes first installed were steam propelled, whereas those introduced later were equipped with electrical power.

Thus far the principal utilization of electrical power in iron ore handling is found in the handling of the ore either at unloading docks, such as those at the ports in the great lakes or at furnaces. The best exemplification

cars to furnaces, or stock piles to furnaces, as the case may be. Each plant is capable of storing from 2,000 to 3,000 tons in a working day of 10 hours and can, under ordinary conditions, transfer from 1,500 to 2,000 tons from storage piles to furnaces in the same interval. In taking ore from the stock piles to the furnaces it is customary to employ what is known as a “bucket shovel,” which is capable of scooping up the ore without the use of hand labor such as is required in filling the ore buckets in the holds of vessels.

At the Duquesne plant the automatic dumping bucket is also employed to some extent, particularly for the direct transference of ore from cars to the furnaces. This type of bucket is made of iron and steel plates, with two side pieces, the lower edges of which are flanged inwardly, to which is riveted one of the curved pieces forming the bottom. The latter is made of two

pieces with a layer of thick tarred felt between them in order to prevent wear and the denting of the outer plate. The form of the bottom has been designed to withstand, without distortion, the vertical strain of the load carried.

The pivotal points to which the bail is attached are so located as to give the most positive action to the dumping motion of the bucket, insuring the complete discharge of the contents and at the same time leave the bucket itself in a condition to balance which insures its righting itself and re-engaging with the catch lever of the bail. The catch levers of the bail engage with the lugs on the side of the bucket and project above the bail at the other end to be there actuated by the dumping levers of the machine or by hand. Stop lugs limit the motion of the bucket in turning on its trunnions. The automatic dumping bucket is mounted on extremely strong cast wheels which turn in bearings of malleable iron housings, fastened to the bottom plate. The entire upper edge is made rigid by a bar-iron binding which also acts as a cross brace. Parallel vertical angle irons arranged on each side of the bucket furnish support to the middle portion of the side plates and afford points of attachment for the bail, pivot points and lugs. The contour of the upper edge is such that it can be placed flush with the edge of a car so that the ore can be shoveled or pushed directly into the bucket.

over all, with a capacity of ten tons in the bucket.

In view of the present intimate relations between ore handling interests and blast furnaces on the one hand and the plants for turning out various forms of finished material on the other, it will not perhaps be amiss to say a word regarding the increasing use of electric cranes and other electrically propelled devices for handling the product of iron and steel plants at various steps in its evolution after it has lost the semblance of iron ore.

One of the notable appliances of this character is the electric traveling crane for handling ingots designed by the eminent engineer, Alexander Brown, for use in charging ingots into soaking pit furnaces and taking them again from the furnace and delivering to the rolls. The original cranes of this type were only five tons capacity but the capacity has been gradually extended to 20 tons, and indeed most of the cranes of this design which have lately been installed handle up to that weight.

Another valuable electrical worker which has a place of present day practice is the overhead traveling crane used for handling ladles in connection with open hearth steel operations. The crane is electrically operated and is of 40 tons capacity. A remarkable demonstration of the universal use of electric cranes in many branches of the iron and steel industry is afforded

such as I beams, channels, plates, in the shipping yard of the firm in question. This crane has a length over all of 320 feet and a capacity of five tons on the hook, and was made for handling long lengths of beams measuring as much as 60 feet.

Many men in the iron and steel industry believe that the five ton balanced cantilever crane of the revolving pattern has a future as the coming favorite apparatus for supplying not only iron ore but materials of all kinds to blast furnaces. Nor is this supposition without the foundation of practical demonstration for such a crane is in use at the furnaces of the Punxsutawney Iron & Steel Company, at Punxsutawney, Pa. This crane is 353 feet in length and is utilized for handling ore, coke and limestone, and even for transferring the pig iron from the furnace to storage or shipping points. This crane by reason of its great length and the fact that it swings through an entire circle, is enabled to transfer the iron ore to the furnaces either direct from the railroad cars in which the raw material has arrived at the yard or from the storage piles which contain the surplus supply.

Electric lifting magnets which are used particularly in the transference of plates and other forms of finished steel occupy a unique place in the category of electrical appliances which are proving useful in the iron and steel industry. Nor is the possible field of usefulness of electricity exhausted either in the broad field or the more limited sphere of iron ore handling. Many electrical engineers who have looked into the matter predict that the time will come when practically all the unloading of the iron ore from cargo carriers operating on the great lakes will be performed by automatic unloaders operated by electricity.—*American Manufacturer*.

Rafia Fiber for Cigarette Paper.

Rafia, rafia, or raphia fiber, one of the natural vegetable products peculiar to Madagascar, has long been known as an article of European importation, chiefly employed for horticultural purposes. It is, moreover, woven on hand-loom by the natives of the island into various fabrics, from the coarsest sackings to a stuff with the wool of white silk, so fine that it is used by ladies in Europe for dress materials. Some small quantities of one variety occasionally find their way to New York, under the denomination of rabas, a striped, colored, medium quality, forming a unique and novel tissue for draperies and curtains.

In the *Journal Officiel*, of Tananarivo, there recently appeared an interesting reference to the new experiment of employing rafia fiber for the manufacture of cigarette paper. The French firm which has taken the initiative is that of Messrs. A & P. Duplat freres, 17 rue des Bons-Enfants, Marseilles, and samples are now in the Commercial Museum at Tananarivo. The paper presents the qualities of decided suppleness and strength, and as the fiber from the start is tasteless, inodorous, and exceedingly clean, it certainly recommends itself to the most fastidious. The attention of paper manufacturers, always in search of new production, should be directed to the possibilities of this fiber for other uses. These are too varied to mention, but will suggest themselves to the scientific manufacturer.

Restricting Inventions by Standardization.

It is a mistake to think that what is now known in the industrial world as standardization has arisen from the development of modern machinery. Primarily, standardization is the attempt of the human race to save brains, which are dear and scarce, at the expense of hands, which are cheap and plenty. The first set of flint arrow-head makers in the palaeolithic age were artists and inventors; the second set were artistic imitators of the first set; the third set were common laborers making the standardized article by rule of thumb.

Modern standardization of machinery was made possible by the manufacture, by Sir Joseph Whitworth, of measuring instruments of sufficient accuracy to make the variation between like parts turned out from the same machine not more than one-thousandth of an inch. The standardization of parts is an economical gain so long as its practice does not operate to prevent designs based upon new inventions from being carried into effect on account of the cost of their production in upsetting existing standards.

But it must not be forgotten that, looked at from one point of view, standardization is equivalent to crystallization,—that is, the death of invention so far as the standardized part is concerned. Imagine, for example, a newly invented screw machine which would turn out screws at half the present cost, but only at a pitch different from the standards now in use. It would take years of effort and a lavish outlay of capital to overthrow the vested interests which have grown up around the present standard pitch of screws. Moreover, in the broadest sense, the industrial unit which runs to as nearly as possible complete standardization of its products is in great danger of having ultimately a set of automaton turning out its work, so that when improved processes, demanding intelligent skill, come up, the unit is found wanting in flexibility and adaptability, and is, therefore, easily passed in the race by some younger rival which has not had the chance to make standardization a fetish. * * * * *

Broadly speaking, standardization should be restricted to parts and should never be applied to wholes. There is a large locomotive work in the United States which has preserved all its patterns and working drawings for over half a century. When an order for a new locomotive is received, the pattern index is searched and so great is the accumulation of patterns and so narrowly restricted is the originality of superintendents of motive power that it now rarely happens that all the patterns necessary for the building of that particular locomotive are not found in the pattern "library," as it is called. This is as near an approach to the ideal in manufacturing as it is possible to reach, because any number of not standardized whole locomotives can be assembled out of standardized parts, and there is, thus, great flexibility of type in conjunction with the utmost cheapness in the reproduction of parts.—E. H. Mullin, in *Cassier's Magazine*.



ORE BRIDGE AT CARRIE FURNACES OF THE CARNEGIE STEEL COMPANY.

(Courtesy of American Manufacturer.)

The Duquesne plant above described handles all the ore for the four furnaces comprising this institution, each of which has a daily capacity above 600 tons. An equipment of ore bridges still more interesting in some respects than those described are employed for handling iron ore in connection with the Carrie furnaces of the Carnegie Steel Company, at Rankin, Pa. In fundamental principle involved these bridges are not dissimilar to those at the Duquesne furnaces, but those at Rankin are claimed to be the largest bridges of this type ever built, having a length of 558 feet

by the Homestead beam yard of the Carnegie Company where there is a full equipment of electric travelers. The Carnegie Company also has an overhead traveling crane which is peculiar in that it has been built to operate on curved track.

That electricity has no particular limitations as a motive force for handling material at iron and steel plants is attested by the equipment lately installed by American manufacturers at the Rothe Erde Works, at Rothe Erde, Germany. The apparatus is in the form of a cantilever crane and is used for handling material

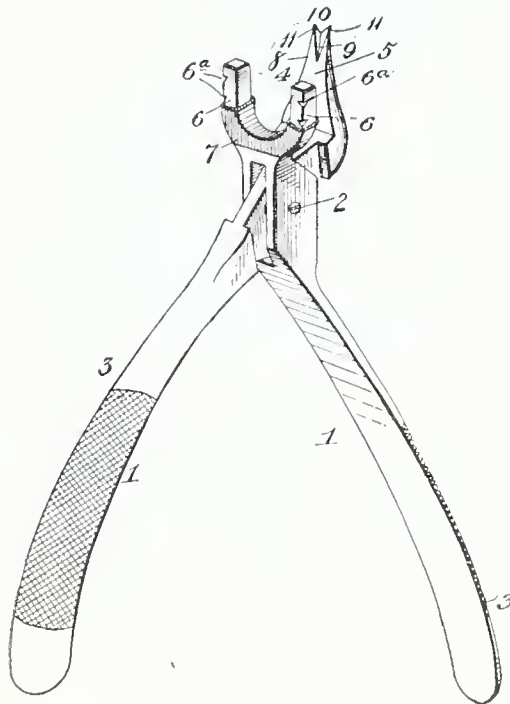
CLEVER NEW PATENTS.

Dental Forceps.—Churn Power.—Adjustable Shelf Bracket.—Ventilator Flue.

Dental Forceps.

A dental instrument that will be a boon to a long-suffering public has been invented by Dr. Seabird H. B. Cochrane, a well-known resident of Canal Winchester, Ohio, the object of the invention being to provide an instrument by which roots of teeth can be removed without injuring the gums.

The device comprises two members 1, which are pivoted at 2, and shaped at 3, to form grips or handles. Jaws 4 and 5, are formed on the members 1. The jaw 4, termed the "fulcrum-jaw," comprises two prongs 6, extending in the same plane and serrated at 6a to engage and hold a flexible covering 7 therefor, constructed of rubber, leather, or the like, to prevent injuring the jaw and gums of the patient. The distance between the prongs is sufficient to enable them to be set astride the jaw of a patient. The jaw 5 is the elevating or lifting jaw, and consists of a single prong 8, set at an angle to the plane of the prongs 6. The inner face of the prong is traversed by a V-shaped groove 9, and the point 10 is beveled, thereby forming two short prongs or teeth 11, adapted to engage the root of a tooth.



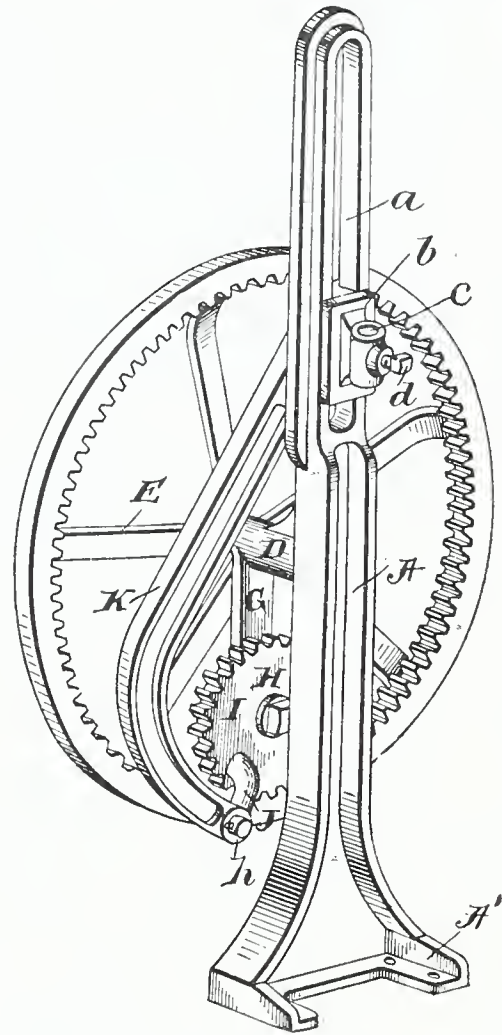
In operation, the prongs 6 of the jaw 4 are used as a fulcrum for the instrument and set astride the jawbone or against the side of the gums, and the prong 8 then engaged on the root to be extracted. The root is then removed by depressing the handles, giving a prying movement.

Churn Power.

A new churn power, which may be applied to the top of any churn, has been patented by Mr. John A. Maddox, of West Union, Ohio, who has assigned his entire interest to Mr. Harvey J. Thompson, also of West Union.

Referring to the cut A, represents a standard which has a lower enlarged base A', that is secured to the top of the churn-body by bolts or screws as desired. The churn may be of any desired construction, and is provided with the usual upwardly extending dasher-shaft. The upper portion of the standard is provided with an elongated vertically arranged slot a, which has mounted therein the slide b, that has on one side an outwardly extending vertically arranged socket c, adapted to receive the upper end of the dasher-shaft, and said socket is provided with a set-screw d, by means of which the dasher-shaft may be secured therein in any desired position. The standard A, has a horizontally arranged elongated projection below

the elongated slot. The outer end of the horizontal projection is reduced and rounded in order that it will receive the drive-wheel E, and form a bearing therefor, and the extreme outer end of said projection is threaded and a nut is screwed thereon, by means of which the drive-wheel is held in

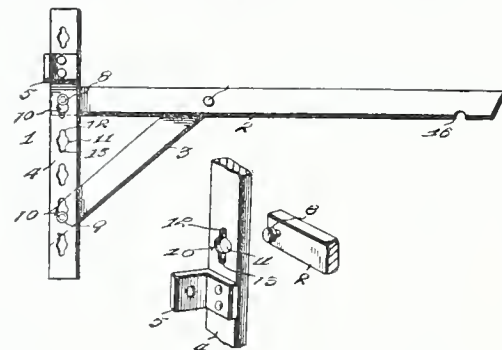


place. The drive-wheel is dish-shaped, having the concave face adjacent the standard, and the inner edge of the wheel is provided with teeth. The outwardly extending arm or projection D, has, adjacent the wheels, a downwardly extending arm G, provided with a horizontally arranged opening, and a screw H, carrying a small pinion I, enters the opening and the pinion is thus rotatably mounted upon the arm. This pinion is adapted to mesh with the teeth carried by the inner face of the large drive-wheel and by means of which said pinion is caused to rotate. Rigidly secured to the side of the pinion, adjacent the standard and near the outer edge thereof, is an outwardly extending arm J, carrying at its outer end a horizontally arranged pin h, which has a transverse opening therein and a spring-key for securing the pitman thereon. Loosely secured on the pin is a curved pitman K, which extends upward and has its upper end loosely connected to the slide b. By having the pitman curved it will not engage the arm D, carried by the standard A, and thus it allows the pinion I, to revolve and raise the lower pitman, which in turn raises and lowers the slide b, in the standard, and the dasher-shaft being secured thereto the dasher will be reciprocated.

Adjustable Shelf Bracket.

A unique and simple adjustable shelf bracket has been patented by a well known inventor of Troy, Ohio, Mr. William C. Peckham, by name. In the accompanying illustration 1 designates the adjustable bracket composed of a horizontal supporting bar 2 and an inclined brace 3, forming a fulcrum for the bar 2, which is detachably interlocked with a support 4, consisting of an upright bar. The latter is constructed of metal or other suitable material, and is provided at intervals with knees 5, riveted to the support and provided with one or more apertures for the reception of nails, screws,

or other suitable fastening devices for securing the support to a wall. The brace 3, which is inclined, is pivoted at its upper end by a rivet to the horizontal bar 2, at a point between the ends thereof, and the inner ends of



the bar 2 and the brace 3 are provided with studs 8 and 9. These studs have circular heads and are adapted to be passed through apertures 10 when arranged at the centers thereof. The apertures 10 preferably consist of cen-

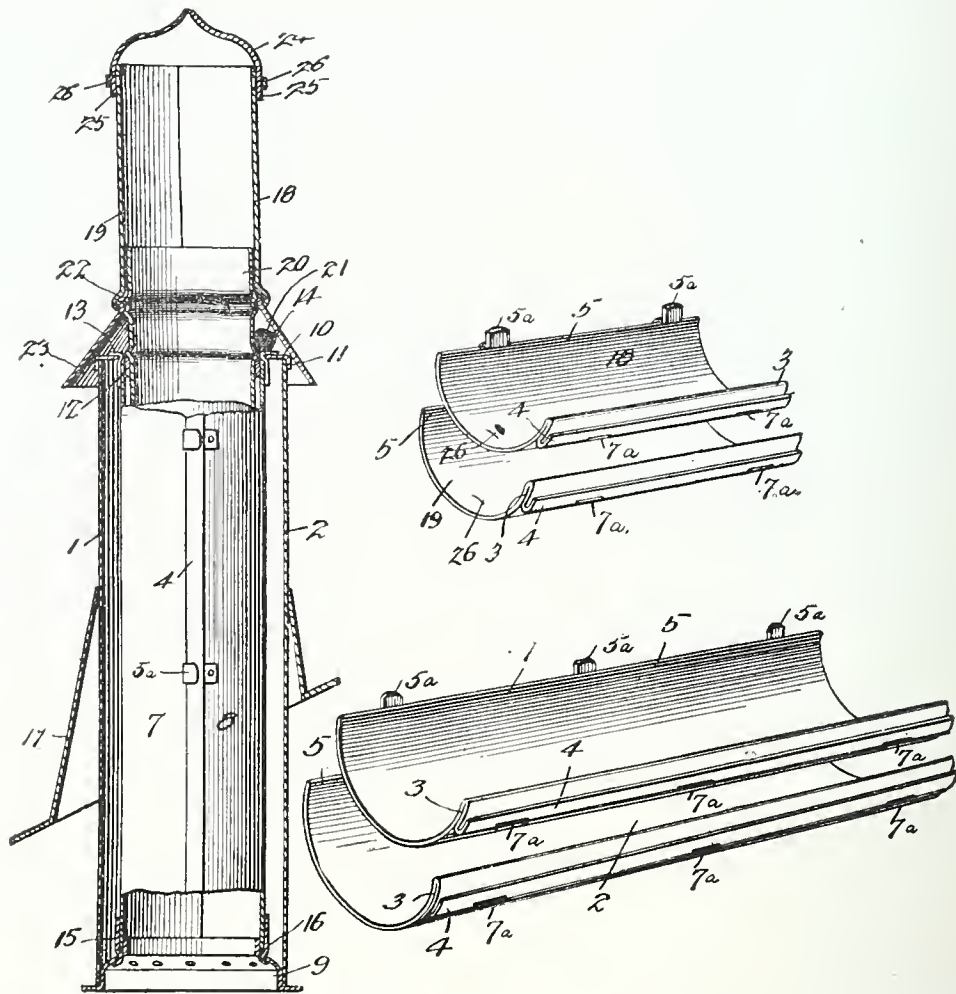
Ventilator Flue.

Mr. Thomas J. Goodwin, of Lampasas, Texas, has for sometime been working on a ventilator-flue constructed of detachable sections which can be dismembered and will "nest" or pack one within the other so as to occupy little space while being shipped. As a result of his experiments, he has obtained a patent on a structure, one form of which is shown herewith.

The flue employed for illustration shows an outer casing formed in two main sections 1 and 2, one of each section formed with one edge folded over, as at 3, and thence folded back again upon the first fold, as at 4, the latter fold forming a socket adapted to receive the opposite unfolded edge of the other section. By this means the two sections when combined form a completed cylinder with overlapping joints. To "lock" the sections thus

tral circular portions 11 and the upper and lower contracted portions 12 and 13 of less width than the heads of the studs, which must be brought to the central portions of the apertures 10 to engage the bracket with the support and to disengage it therefrom. The stud 9 of the brace 3 is adapted to lie in the lower contracted portion 13 of an opening 10 when the bracket is in position for use, and the headed stud 8 of the inner end of the horizontal bar or lever 2 is received within the upper portion of another opening 10. In assembling the parts, the studs are brought together slightly to bring their heads opposite the central circular portions of the openings, and after the heads of the studs have been passed through the openings, the outer portion of the horizontal bar or lever 2 is forced downward, whereby the stud 8 at the inner end of the bar 2 will be carried into the upper portion of its opening and the stud 9 will be carried into the lower portion of its opening.

and 2. The two sections are connected at their lower edges to an annular perforated collar or socket 9, having an air-chamber between the two sections, through which the air will freely pass. The upper edges of the two main sections are coupled by an annular perforated ring or collar 10, the outer edge of the collar being turned downwardly outside the outer sections 1 and 2, as at 11, and the inner edge turned downwardly inside the inner sections 7 and 8. Attached to the inner sections 7 and 8, are small clips 13 and 14, adapted to project through apertures in the collar 10, and be bent outward over the collar, and thus form a means for detachably locking the collar to the sections, and similar clips 15 and 16, are attached to the lower edge of the inner sections 7 and 8, adapted to pass through apertures in the collar 9, and be bent over the collar to form a means for detachably connecting the collar to the sections. Surrounding



united, small clips 5a are attached to the unfolded edges of the sections and adapted to pass through apertures 7a, formed through the bottom of the folds 4, and be bent back over the folds. The flue shown is of the double style consisting of an outer shell formed of the sections 1 and 2, and an inner shell formed of similar but smaller sections 7 and 8, having the folded-over edges and the locking-clips of the same construction as in the sections 1

the outer sections 1 and 2, is a roof-shield 17, of the usual form, which will be slidable upon the sections, and inclined to conform to the "pitch" of the roof through which the flue projects. Connected removably to the upper end of the main flue-sections is an extension-flue, and above this extension-flue is a cap or rain-shield for the extension, and between the extension-flue and the main flue is a rain-shield collar.

THE UTILIZATION OF WASTES AND BY-PRODUCTS IN MANUFACTURES.

WITH SPECIAL REFERENCE TO THE DECADE OF 1890-1900.

By HENRY G. KITTREDGE, of the Census Bureau.

PART III.

LUMBER AND TIMBER PRODUCTS.

Nearly all of the formerly waste products of lumber and timber are now turned to some utility, and some of the new products thus formed are of considerable value. Of this latter class may be mentioned sawdust, which was formerly considered an absolute waste material, and was allowed to float down the stream or was thrown into a heap where it could be most conveniently disposed of. French cabinet-makers have found a way of preparing this material which gives it a value far above that of solid timber by a process that has been in vogue for at least twenty-five or thirty years, combining the use of the hydraulic press and the application of intense heat. By this process the particles of sawdust are formed into a solid mass capable of being molded into any shape and of receiving a brilliant polish, and possessing a durability and a beauty of appearance not found in ebony, rosewood, or mahogany. This product is known as "Bois durci." Artificial woodwork therefore seems to have a promising future. Alum, glue, and sawdust, kneaded with boiling water into a dough, and pressed into molds when dried, is hard and capable of taking on a fine polish. Ornaments of great beauty can be made from it very closely resembling carved woodwork.

The production of acetic acid, wood naphtha, and tar from sawdust is one of the latest enterprises in Norway. A factory has been started at Fredrikstad capable of distilling 10,000 tons of sawdust in a year. It also manufactures charcoal briquettes, which are exported to the Netherlands. The acids are chiefly placed on the German market, while the tar is mostly consumed at home. The factory is said to be the first of its kind erected in that country. According to an English patent of 1897, sawdust may be so prepared as to be noninflammable, and then applied to jacketing of boilers and other purposes.

In the Journal of the Society of Chemical Industry, for 1898, is described a series of experiments for obtaining alcohol from either coarse or fine sawdust, without affecting the yield. It was found that pine sawdust as compared with fir sawdust was superior as yielding a purer alcohol. It was also found that a high yield of sugar was obtained from birch sawdust, the yield of sugar being about 30.8 per cent of the quantity of birch wood used. The quantity of alcohol obtained from 220 pounds of air-dried sawdust (20 per cent water) was 7 to 8 quarts. The quality of the alcohol distilled from the fermented liquid was said to have been excellent, and the preliminary experiments indicated that the trifling impurities found in it could be readily removed.

A patent taken out in England in

1896 for utilizing certain waste products of wood describes a process of constructing or manufacturing a product resembling wood from a mixture of sawdust or wood refuse and certain quantities of gums, resins, or other suitable agglutinants, either in a dry state or dissolved, the compound being subjected to pressure at a temperature sufficiently high to soften or melt the gums or resins.

According to the United States census of 1900 the amount of sawdust used in the clay and pottery industry of this country cost \$19,687, or 0.17 per cent of the total cost of all the raw materials used.

The utilization of wood pulp in the manufacture of paper is not new, but its increased use is very marked, as will be seen by comparing the statistics of the census of 1890 with those of 1900, in the amount of raw materials used in the manufacture of paper. Early in 1826 the brothers Cappucino, paper makers of Turin, discovered a means of supplying the need for paper-making material, caused by the scarcity of rags in the fabrication of paper, by substituting the thin bark of the poplar, willow, and other kinds of wood. The good quality of the paper made from this material was recognized by the Academy of Sciences, after an examination of the manufactured product, and so important was the discovery considered that the King granted the brothers an exclusive privilege for ten years for the manufacture of paper from ligneous materials. In 1833 a patent was granted in England to J. V. Desgrand for making paper and pasteboard from wood reduced to a state of paste. Poplar wood was thought at that time the best for this purpose, as it had been in Italy twelve years previous. A patent was granted in 1855 to William Johnson for improvements in the application of various substances containing wood fiber, as the base, or inner bark, of the lime tree, the willow, birch, and alder, to the manufacture of wood paper pulp. At the London International Exposition of 1862 Wurtemberg contributed several samples of paper made from wood pulp mixed with rags, the proportion of the former varying from 10 to 80 per cent; and the paper was reported to be serviceable, although of a low grade. The wood was simply rubbed down into pulp against the periphery of a wheel prepared with a rough face. At the Paris Exposition, 1867, was to be seen in action a large machine of 50 horsepower for making wood pulp for paper. Only white woods were thought to be available for this purpose.

There is no limit to the range of woods suitable for paper making, though the pine family is most suitable for this purpose, and invention has been mainly directed to methods for reducing wood to a suitable condition for use in paper manufacture. The first method of preparing pulp from

wood was to reduce the wood to thin shavings, which were soaked in water for a week or more, then dried, and then ground to powder by a crushing mill of some kind. This powder was mixed with rags to form a pulp, in which condition it was suitable for converting into paper. The principal defect in this method was the production of a very short fiber. Chemically produced pulp was resorted to as better preserving the natural fiber of the wood. The chief objection against it was its cost, but this has now been largely, if not entirely, overcome and the industry placed upon an economical basis.

The value of pulp wood entered for consumption in the United States for 1899-1900 was \$1,109,139.11; the wood pulp entered for consumption in 1899-1900 was as follows:

	Pounds.	Value.
Mechanically ground	70,222,823	\$491,889.36
Chemically bleached	20,112,995	476,456.00
Chemically unbleached	90,207,760	1,436,052.36
Total	180,543,578	2,404,397.72

The utilization of the needle-shaped leaflet of the pine tree, either alone or in combination with some other fiber, as cotton, for example, has frequently been attempted with more or less success to produce an article of commercial value for textile or other purposes. Near Breslau, in Silesia, there have been erected factories that convert the pine leaves into what is called "forest wool," for wadding. Other factories have been erected in other parts of Europe for a similar use of these leaflets, as in Sweden, Holland, and France. The products made from these pine-tree leaflets have been exhibited at a number of expositions, where they attracted more or less attention as furnishing suitable material for stuffing mattresses and articles of furniture in place of horsehair; for manufacture into hygienic fabrics for medical use, and for articles of dress, such as inner vests, drawers, shirts, chest preservers, etc. In the preparation of textile material an ethereal oil is produced, which is employed as a curative agent and oftentimes as a useful solvent. Some attempt has been made of late in the state of Oregon to make use of these leaflets by reducing them to a fibrous condition suitable for mixing with cotton, to be spun into yarn for weaving.

ARTIFICIAL DAYLIGHT.

Secured Through Wireless System Patented By Young American Inventor

One of the most promising scientific innovations which is now, in the course of perfection by D. MacFarlan Moore, of New York, is a system of electrical illumination which dispenses entirely with the use of wires strung over the building, and produces the nearest approach to cold or daylight which has ever been reached. Mr. Moore is a modest young man, who presents his discoveries to the public through the somewhat conservative method of papers read before technical societies. He is engaged in a wonderful work, and one of very great importance. He has been struggling over this problem in his laboratory for a great many years. Five years ago he made the first presentation of the subject to a gathering of electricians in New York. Since then he has been working constantly on the invention, and has taken out about 100 patents covering different features of it. In the patent specifications he states that "the object of this invention is to avoid the use of electric conductors for distributing the electrical energy to the lamp or lighting portions of the system, and thereby to permit the illumination of buildings and contained areas without the presence of conducting wires or circuits of copper distributed throughout the building or the rooms thereof."

Mr. Moore's system consists of running transmission tubes along the upper portions of the room to be illuminated. The tube contains a gas of such character or degree of rarefaction that by the application of the electrical energy to the terminals of the tube it will be rendered luminous by the transfer of the energy from one terminal of the electrode to the other. These tubes are scattered generously around the room, and when put in operation produce a light much resembling the diffusion of ordinary daylight. Of course, it is necessary to introduce the desired energy into the building by the use of wires, but by this system the "wiring" of a building in the ordinary sense is entirely dispensed with. This light is almost without heat, and represents a much greater degree of efficiency than that in any other system of illumination. There is a complete absence of fire risk, even when the lamp is operated at high voltages.—*Philadelphia Record.*

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Department of E. G. Siggers, Patent Lawyer, Washington, D. C.

Alfred H. Hunting, Iron Mountain, Mich. Chair Attachment.—This attachment is adapted to be applied to an ordinary chair, so that a high chair is provided to support a child at the proper height with respect to a table. The construction is extremely simple, comprising rear standards having hooks at their upper ends which engage over the back of the chair. To these standards are hinged a seat and arms, the latter carrying a suitable tray. The entire structure is foldable into a small compass, and can be readily applied to or detached from a chair.

John C. Shandle, Fairmont, West Virginia. Whiffletree Coupling.—This device consists of a bracket which is secured to the pole or tongue and has an upstanding bifurcated ear, through which passes a pivot pin. A forked brace extends from one end of the bracket, embraces the ear, and receives the opposite ends of the pivot pin. A link has one end loosely mounted in the bifurcated ear and upon the pin which passes through the same, the free end of the link being provided with a perforation to receive the usual coupling pin which passes through the whiffletree and the pole, said link lying upon the upper side of the whiffletree, and thereby bracing the upper end of the coupling pin.

William S. Sutherland, inventor: Daniel G. Elliott, assignee, Chelsea, Indian Territory. Nut lock.—The bolt and lock are provided with aligned grooves in their opposite faces. The lock consists of a washer that is placed upon the bolt over the nut, this washer carrying stems that fit in the aligned grooves and thus prevent the rotation of the nut. The washer is held against displacement by means of opposite tongues which engage the threads of the bolt. Thus, not only is the nut held against turning, but, if desired, the lock can be removed and replaced without injury to the bolt, the nut, or itself.

Glascock Brothers Manufacturing Company, Muncie, Indiana. Baby Walker. Messrs. Charles O. and John W. Glascock, comprising the above firm, have patented an article of the above character, which is a decided improvement over anything heretofore invented in this line. It consists of a base ring mounted upon wheels, and a body ring supported above the base ring by means of coiled-spring standards so constructed that the body ring can yield in a vertical as well as in a lateral direction. Suspended from this body ring is a seat that can be adjusted to the height of the child, and a suitable tray is also fastened to the body ring. The child is placed within the ring and upon the seat, so that he can thus propel himself about a room without danger of injury from contact with the furniture, heated stoves, or the like.

Rufus F. Sprague, Greenville, Michigan. Power Driven Tool. Mr. Rufus F. Sprague, the President of the Gordon Hollow Blast Grate Company, of Greenville, Michigan, has patented a very simple and useful time-saving tool that may be employed for various purposes, such as driving screws, threading nuts on bolts, boring holes and the like. He has obtained a patent that is broad enough to cover the construction whether applied to a hand tool or a fixed machine.

In the hand tool proposed by Mr.

Sprague, a tubular casing is employed having at one end a handle, and provided at the other end with a head in which is rotatably mounted the tool spindle. This spindle is also slidable in the head and carries on its inner end a clutch member, the outer and projecting end being formed into suitable shape to operate upon any well known article, as for instance, a screw or nut. Surrounding the exposed end of the spindle is a coiled spring, one end of which bears against the outer end of the head, the other end bearing against a collar adjustably attached to the spindle, this spring, therefore, holding the spindle in its outer position. A flexible shaft connected with any suitable driving power passes through the casing and has its inner end journaled in a suitable bearing therein, this shaft carrying a clutch member that is normally spaced from but adapted to coact with the clutch member of the tool spindle.

Richard H. Rutherford, Marion, Oregon. Car Coupling.—Mr. Rutherford proposes a coupler of a novel form. He employs sliding rods arranged upon the under side of a car and connected at their rear ends by a cross beam, against which tension springs bear. The outer ends of these rods are connected to swinging links that carry at their free ends an arrow head jaw, which jaw is arranged to interlock with a similar jaw on the car to be coupled thereto. The coupling is actuated by a rock shaft journaled upon the end of a car and having offset arms carrying rings that surround the swinging links, so that by operating a rock shaft the coupler jaw is elevated or depressed.

Dr. George W. Smith, Hardin, Missouri. Motor Vehicle.—The object of the present invention is to provide an automobile in which the power is applied to all four of the wheels, thus making it especially useful on heavy and hilly roads. To this end both the front and the hind wheels are secured to the axles, and a driving shaft runs longitudinally of the vehicle, being geared to both axles. The manner of supporting the rear axle is novel, as is also the connection between the driving shaft and the front axle, so as to permit the turning of the front wheels to guide the vehicle. Actual use has shown the entire practicability and usefulness of the invention.

John E. Caps, Kansas City, Missouri. Three patents.—The first of these is driving mechanism for self-propelled vehicles, but of an entirely different nature, being especially applicable to bicycles, though useful upon other vehicles. In this instance the wheel of the vehicle is provided with a rack engaged by a spur wheel, driven by a suitable motor. The shaft upon which the spur wheel is secured, is provided with clutching mechanism, and the motor is in the form of an explosive engine that is built along novel lines. The entire structure is such that it may be attached to the frame of an ordinary bicycle and does not interfere with the usual pedal mechanism; in fact, the latter can be used in conjunction therewith.

The second invention is an improvement in variable speed mechanism. Two expansible pulleys are mounted upon parallel shafts and are connected by an endless belt. These pulleys each comprise spaced end disks, between which is mounted an expansible rim formed of sections. The sections are connected by crossed links with sliding heads which can be adjusted toward and from each other by a worm shaft. Means are employed for tightening the belt, and the whole is mounted upon a frame of novel form.

The third is a printing press, and marks a distinct advance in the art of multi-color printing. The press is of the rotary type, and is designed with special reference to printing in any number of positive colors from a

stereotype or other plate, without the possibility of the different colored inks being mixed or blended. The pressembodies novel means for quickly and accurately adjusting the type form or plate, the ink distributing mechanism and the color compartments of the ink-fountain with such absolute nicety as will cause the bands of different colored ink to cover just such portions of the plate as may be desired, without danger of blending. It also includes a novel vibrator for transferring ink from the dip roll to the form rolls, and means whereby the vibrations of the distributor may be regulated during the operation of the press. Mr. Caps is a practical manufacturer of printing presses, and his invention has already met with success in its introduction.

Azro D. Ellis, Minneapolis, Minn. Cream Separator.—This invention belongs to that class of separators in which cold water is poured into the milk, thus causing the cream to rise to the top. A cylindrical casing is employed within which is arranged a conical bottom having a glass covered sight opening therethrough. The water-conducting tube passes through the cover and has a lower offset end arranged in the apex of the bottom, said end having a plurality of discharge orifices. A wire frame or basket is detachably secured in the bottom and is adapted to hold a piece of ice so as to keep the milk and water in a cold condition.

Charles A. St. Onge, Dover, Maine. Shuttle Check.—In this device a metallic frame is employed, one end having an offset ear, the other end carrying a pivoted plate. A buffer strap is attached to the free end of the plate at one end, its other end being secured to the frame. The strap is held taut by means of a coiled spring bearing against the plate and adjustable through the medium of a threaded spindle having a nut bearing against the spring. With a construction of this sort, the frame will last indefinitely, and when the strap becomes worn it may be readily replaced with a new one without disassociating the other parts.

George H. Ruhlman and George C. Miller, of Cardington, Ohio. Can Jacket for Can Capping Machines.—This device is designed to provide for running cans of different diameters through one and the same capping machine, without altering or adjusting the latter, and consists of inner and outer spaced cylindrical shells which are open at opposite ends, opposite rims or bands connecting the corresponding end edges of the shells, and an inner can support adjacent to the lower end of the body, so as to support a can within the device. The external diameter of each jacket is equal to the diameter of the largest size of can, while the internal diameters vary according to the external diameters of smaller cans.

Lot H. Ainsworth, Philadelphia, Pennsylvania. Device for Applying and Removing Electric Light Bulbs.—This device consists of an open ended tubular socket to receive a pole or handle at one end, and having a plurality of outwardly bowed spring fingers forming a cage or basket at its opposite end, said fingers being covered with rubber or other suitable material. In using the device, the lamp or bulb is received within the basket, and in view of the frictional engagement between the latter and the lamp, said lamp may be readily screwed into and unscrewed from its socket.

Thomas J. Baskett, Dexter, Maine. Cooking Crane.—This device comprises a standard pointed at its lower end to be driven into the ground, and is also provided with two or more longitudinal series of laterally projected perforate ears. These ears form bearings for substantially horizontal

utensil-supporting arms, each of which is provided at its inner end with a cross head having terminal pivot projections for engagement with any pair of adjacent ears, whereby the arm may be swung over the fire and also to one side thereof. One of the arms has an enlarged spider at its outer end for the support of a frying pan, and is also provided with a pivotal yoke-shaped device to support the handle of the pan.

Albert E. Wood, Meriden, Conn. Hose Reel.—This device embodies a pair of upper and lower bracket arms through which projects a downwardly directed bar provided at its lower end with a horizontal yoke, between which is rotatably mounted a reel, and the latter is provided with an intermediate outwardly directed projection about which the intermediate portion of the hose is adapted to be engaged for convenience in winding the hose upon the reel. The rod is also rotatably adjustable, so as to swing the reel into different positions for convenience in reeling and unreeling the hose in any desired direction.

Wesley Turner, Danville, California. Hillside Plow.—The patent recently issued to Mr. Turner discloses a hillside plow comprising a frame and one or more plows, which latter are connected to movable elements of the frame, so as to be reversed by the manipulation of a lever. The frame comprises side beams pivotally connected to transverse bars. Each beam is equipped with a land wheel and with one or more plows, the rotatable shanks of which latter are connected to operating mechanism brought into action to reverse the plows when the beams of the frame are shifted longitudinally. This shifting of the frame elements is effected by a lever extending rearwardly, so that the operator by throwing this lever to one side or the other may effect the shifting of the frame beams, to cause either of the land wheels to be disposed in advance and to simultaneously reverse the plows.

Jacob M. Cripe, Mattoon, Illinois. Heating Apparatus.—The heating system disclosed in Mr. Cripe's latest patent comprises what is termed a self-heating radiator, for the reason that the generator is carried by the radiator and is portable therewith. The heater or generator is so equipped that any character of solid fuel, such, for instance, as coal, wood, etc., may be utilized to heat water or to generate steam, which is caused to circulate through the radiator and to return to the heater for circulation. The construction of the device is such that an explosion is absolutely impossible, and the entire heating plant is arranged for bodily transportation to any desired point, without necessity for disorganization. It is claimed for the Cripe system that it will save from 60 to 75 per cent of fuel over heating devices and systems now in use, and there is every reason to believe that this claim can be substantiated by a practical test.

William C. Evants, Oakland, Cal. Cultivator.—The cultivator patented by Mr. Evants embodies a frame and cultivating shovels as usual. The shovels, however, are of novel form inasmuch as they are shaped to form twin cutters at their opposite edges, and means are provided for regulating the depth of penetration of the shovels at either end or both ends of the frame. One of the most important features of the invention is the equipment of the frame with a simple guiding device at its rear end, and with fenders associated with the outermost shovels and acting to prevent injury to delicate plants, by preventing the overturning of dirt or large clods thereon, and also to prevent the shovels from coming in contact with trees when cultivating, as for instance, in orchards.



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WASHINGTON, NOVEMBER, 1902.

Marvels of Modern Locomotion.

This is the age of speed. The great desideratum is to straighten railroads, increase the power of engines, reduce distances, annihilate space, break records. The main objection to the air-ship, from a commercial point of view, is the fact that it does not promise to go at a rate of speed exceeding that attained on the earth. The network of electric roads is spreading over the land, automobiles are coming into more general use, and suspended railways, pneumatic tubes and monorails are among the plans for rapid transit. Not long ago, "a mile a minute" was the goal at which everyone aimed, and the danger of transportation at such a rate was freely pointed out. This has been passed, and without incurring the disasters dreaded by the timid. Now, two miles a minute is predicted by the enthusiast. A new invention is a mechanism designed to increase the power and speed of the reciprocating engine. By doing away with crank and rod, it increases the power by means of a spiral shaft, cross-head and stub shaft, which gives a leverage hitherto unknown in any type of engine. In the steam cylinder no change has been made, except that it has two piston rods instead of one. The machine promises to give railroads the 125-mile an hour locomotive, and to give ocean steamships a power that will overcome the momentum of an ocean greyhound in one minute, instead of the five minutes now required to reverse a large steamship. The new device has run 4,000 revolutions per minute, moving the piston head 2,000 times, something that has never been accomplished with a reciprocating engine. When a car has been devised, along the cigar-shape lines that are most approved, that will stand the increased pressure without retarding the speed, the journey to the Pacific Coast will be cut down to one-half.

Not only on the surface, on the earth,

and in the air are men seeking to attain speed. On the water and below it, efforts are constantly being made to move with greater rapidity. The transoceanic lines compete to reduce by a few seconds the time consumed in the eastward and westward voyages. The news that the S. S. "City of Rome," not so long ago the queen of the Atlantic, is to be sold for junk instead of being placed in some of the less important services, illustrates the value placed upon speed by the managers of oceanic lines, and their appreciation of the fact that they can afford to employ only the newest and best, in the keen rivalry for the carrying trade.

The recent performances of the steam yacht Arrow have aroused widespread interest. This boat, which belongs to a New York millionaire—Mr. Charles D. Flint, reached a speed of forty-five miles an hour, thus breaking the record for vessels of any kind on the water, and surpassing the achievements of the turbine boats, from which so much has been expected. This result was not due to any new mechanism, but merely to the subordination of everything in the vessel to the one object of speed.

The Arrow is a twin-screw yacht, 130 feet long, 12 feet in width, and with a draft of 3 feet 6 inches, with a displacement of 66 tons. The remarkable disparity between length and width will at once be noted. The lines are not materially different from those of torpedo boats. The hull is unusually light. Aluminum is used in the construction above the water, steel frames being employed below, except in the boiler and engine room, where steel is used throughout. The twin-engines are especially designed for high speed vessels, developing 4,000 horse power, or more than that necessary for many heavy ocean steamships. Between the steam cylinders there is installed a series of re-heaters, each of which can supply the entire thermal equivalent of the work expended during the expansion, thus keeping the steam in a super-heated condition throughout its work. These re-heaters also dry the steam and prevent cylinder condensation.

The trial was not only entirely successful, but it is said that in subsequent experiments, an even greater rate of speed may perhaps be attained.

The Liquid Lens in Photography.

Photography abroad, it is said, is being revolutionized by a new discovery that is regarded as of no less importance than the Roentgen rays. The "liquid lens," as it is called, has made possible achievements in rapid work that were believed to be out of the question. By using a certain oil between the parts of a rectilinear lens, the refraction is so increased that instantaneous photographs may be made in the ordinary light of a theater. This is only one of the photographic feats that have been made possible. Another is to take a photograph at midnight, on a pitch-black night, with no apparent light, in fifteen minutes. A third is to make a photograph at midnight, with a fair moon, with one minute's exposure.

The new lens can accomplish other things that are no less remarkable. A photograph may be taken in a theater,

the footlights only being used, in a quarter second of exposure. In an ordinary room, with an exposure of but five seconds, a photograph may be made with an illumination of but forty-eight candle power.

Never in the history of photography has it been possible to achieve anything like this, in point of view of rapidity. To the ordinary amateur photographer, it seems like a fairy tale, but it is, none the less, a scientific fact.

The liquid lens is an English invention, the device of a physician of Brighton, who was led to the experiments that have resulted in its perfection through his work with the microscope. His first trials were made with the object of being able to photograph stage performances at night. He found that the fastest lens he could get was not quick enough to photograph a play in action; that there must be a halt for an instant, posing the figures and losing the time effect, or else the picture would show movement and blue.

A speedier lens was found to be necessary, and finally the doctor devised it, incidentally discovering an oil which, placed between the glasses of the combinations of the lens (and not in the air-spaces, as first tried) shortened the focus materially. What this oil is, the inventor will not say. Its success, however, has been proved by many extremely fine photographs that the doctor has made. It works at a very large aperture and is thoroughly practical, though in actual operation it can be used for small plates.

With this new discovery, flash-light photography will cease to have any reason for existence. Possibilities for the improvement of the cinematograph can be easily seen; and the liquid lens could be made a valuable agency in detective work. With the perfection of minor mechanical devices for the automatic operation of the camera, it may give pause to those who love deeds of darkness to think that an eye, unseen but unerring, is observing and recording their actions.

A NEW BOOK.

WORM AND SPIRAL GEARING.

BY FREDERICK A. HALSEY.

D. Van Nostrand Company, New York.

The author of this publication states that he has found the still-prevalent notion among designers of machinery that worm gearing is necessarily short-lived and of low efficiency; also, that the methods of laying out spiral gearing are not as widely understood as the merit and convenience of that form of gearing make desirable. The author proceeds to show that the theory as to worm gearing is not sustained by the actual facts, and gives as his opinion that the old prejudice against that form of gearing is dying out. He points out clearly the procedure to be followed in order to increase the durability and efficiency in the matter of worm gearing. Both analytical and graphical methods of laying out spiral gearing are given, which it is believed will meet the needs and tastes of all.

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Among all problems which engage the attention of inventors, there seems to be none more attractive than that of combining the telegraph and typewriter in such a manner as to produce a high-speed instrument saving time and labor at the wire. Automatic senders and receivers of one kind or another are submitted to the Western Union at the rate of about one a week, and rejected at the same rate.

There is a fortune in store for the man who can invent a high-speed sending and automatic receiving instrument, but there is one tremendous obstacle in the way of inventors who attempt it. That obstacle is the limit of the capacity of the operator of the typewriter.

It is comparatively easy to invent a combination of typewriting machine and telegraph instrument in which the operator, when he pounds the keyboard at one end of the wire, records, after the manner of the stock ticker, line by line, on ordinary paper at the other end of the wire, the words he frames at his end. The trouble is that he cannot do it fast enough.

The operator who in practice can typewrite 100 words a minute has yet to be found. The speed at which the wire can carry the message is almost limitless. At present it is limited only by the capacity of the operators, sender and receiver, and speed, even more than labor-saving, is the thing the telegraph companies are seeking.

For the last three years the Western Union has been experimenting on two circuits between New York and Chicago and New York and Buffalo with an automatic system called the Buckingham. This is not strictly a combination of telegraph and typewriter. The typewriter is a perforating instrument which punches holes in sheets of paper, which are fed into the sending instrument and are sent and received automatically. By this system from fifty to sixty messages of an average of thirty words each can be sent an hour. The trouble about this is that two or three men are required to prepare the messages.

There is an instrument already invented and now being perfected and developed for commercial use which may be brought into practical use before automatic telegraphy comes to pass. This is the Poulson telephonograph, invented by a Dane. In this instrument, words spoken into a phonograph combined with a telephone are reproduced on patent tape at the other end of the wire. Should this be developed cheaply and universally, it may revolutionize telegraphy.

Among the curious articles advertised for sale, and expressly recommended for persons who suffer from gout, rheumatism, etc., are underclothes made from the skin of the mountain wild cat. Those who have worn these garments in the Klondyke and elsewhere, say that they are very warm and pleasant to the skin.

SCIENTIFIC

PROGRESS.

New Match in Sweden.

Another kind of match, intended to supplant the phosphorous matches which have been prohibited for a year, has lately been introduced in the Swedish market. The inventors of the new match are engineers Landin and Jernander, of Stockholm, who have patented their invention in several countries. This match looks like the well-known potash and paraffin matches, which, however, by reason of the fact that they contain poisonous phosphorous, come under the same prohibition as the old and worthy lucifer match. But the new match, which has been named "Repstickan" (the scratch match), possesses a property which the potash match lacks, viz., it is damp proof and can therefore be lighted against a damp or wet surface, provided this is hard. The inventors claim that Repstickan is the least poisonous match in existence, the safety match not excepted.

New Process for Preserving Meats.

A process for preserving meats and fruits has been recently patented in Germany. The article to be preserved is covered with a mixture of dextrine and gelatine or glue. It is then dipped into a solution containing 5% of formalin, and afterwards slowly dried. This treatment with the formalin solution has the effect of hardening the dextrine coating. To preserve the juice in fresh meats or peeled fruits, it is recommended to first cover them with a thin coating of paraffin, then to dip them into an alcoholic solution of rosin, and repeat the process above described. Under certain conditions, when it is thought best, the provisions may be sterilized in boiling water before beginning the treatment. It is asserted that foods treated in this manner are most effectually protected against all insects, germs, etc.

Glass Bathtubs.

Bathtubs of glass may be expected to supplant all others. They are being made in Germany now, and are said to have many advantages over metal and enamel, the principal one being that they are much cheaper. Besides bathtubs, tanks and vats, such as are used by brewers, distillers and sugar refiners can be made of glass, and the manufacturer is confident that he can replace those for which clay, wood, cement and metal are now commonly used, with superior articles constructed at a lower cost. Glass bathtubs are not fragile. Those being made now are five and six feet long, about two feet wide, and about two and one-half inches thick, in a solid piece.

The process of manufacture is by means of compressed air. It was invented in Pittsburg about twenty years ago, but was limited to making bottles and similar small-sized articles. Paul Stevert of Dresden improved it, and under his process there need be no limit, within reason, to the size of the article made. The method is as follows: the molten glass is taken from

the furnace and placed in a mold, which can readily be swung to any desired position. Compressed air is then admitted through a flexible tube which connects with the bottom of the mold. The air pressure is regulated by valves. As soon as the article is finished, it is switched into an annealing chamber where it is again heated, and then allowed to cool. This toughens it, and after this process it is ready for use.

Horseless Vehicles for Farmers' Use.

The inventors seem to be striving faithfully to relieve the horse of his burden. The latest idea along the line of horseless vehicles is the farmers' trolley road, which will make it possible for the raiser of produce to come to town with his load, dispose of it and return home without the aid of his team, the electric current being made to do all the labor through the medium of a comparatively simple apparatus. The inventor contemplates the installation of private lines by the farmers in a certain locality, or the rental of electric service from one of the suburban trolley companies which now cover the country around every large city. An electric motor is placed on the wagon and power is obtained from the overhead wire, the connecting pole having a flexible adjustment to overcome all inequalities in the roadway. The horizontal portion of the conductor is divided and insulated, receiving the current from one wire and returning it to the other after it has passed through the motor to drive the wagon. The reason for using a return wire parallel with the power wire is to avoid possibility of shocks to the driver when standing beside the wagon and in contact with it, which might prove dangerous if the return current passed to the earth after use. By gearing the driving shaft low, very heavy loads could be transported with comparatively little expense for current; and as there are no heavy storage batteries or power generators aboard, there is plenty of room in the wagon for the loading of produce, etc.

The Wireless Age.

Wireless telegraphy and telephony are close upon us if we may believe the claims of an English company which, it is announced, will begin operations upon a large scale almost immediately, having arranged to build factories in France and England. The system used is called the Armstrong-Orling and differs materially from that of Marconi. The details are kept secret but the claims are extraordinary. It is stated that it is possible by the system to telegraph or telephone fully five miles, and that by the time the company is in working order it expects to be prepared to sell an apparatus by which anyone will be able to telephone or telegraph at least 20 miles. The ground is always used as a conductor. All that is needed is to connect the telephone in the room with the transmitter or receiver by means of a short wire with the nearest gas or water pipe which will carry the current to and from the earth. The wall of the house forms no obstacle. Just how a message will single out its destination without the aid of a "central" is not explained, but the new method would

appear to solve the pole question in the most satisfactory manner. Wire-less and poleless communication may be coming. It is not safe to scoff at any alleged scientific discovery these days.

Curative Effect of Light.

The effect of blue light in reducing inflammation, diminishing pain, promoting absorption of morbid secretions, and curing diseases of the skin, has been shown by several recent researches. Doctor Kaiser, has given to the Vienna Medical Society the results of his investigations on the effect of the blue rays on tuberculosis and tubercle bacilli. He threw the beam of a powerful lantern, filtered through a glass which allowed only blue rays to pass, directly upon cultures of bacilli. Similar cultures were attached to the back of a patient whose chest was exposed to the beam at a distance of five meters, for half an hour daily for six days. In all these cases the bacilli were killed, even when the invisible heat rays were also filtered out. The blue rays, therefore, penetrate the human body. The effect of exposing tuberculous patients to the light was markedly beneficial. A few days' treatment produced a perceptible improvement and a diminution of the number of bacilli in the sputa. Tuberculous abscesses, which had resisted every other treatment during three months, were healed by the blue light in four weeks.—*Literary Digest*.

Incandescent Lamp.

The Shelby Electric Company of Shelby, Ohio, controls a patent recently issued to Mr. Adolpho A. Chaillet, a Frenchman residing in Shelby, Ohio. The object of the invention is to provide an incandescent electric lamp in which the intensity of the light shall be greatest where it is most useful. The great majority of incandescent lamps are supported from above, depending vertically, more or less. Now the common and natural method of coiling the filament is such that the greatest intensity is emitted in a horizontal direction, where it is not nearly as useful as if emitted through the tip end of the lamp opposite its base; while the intensity decreases from the horizontal plane downward to the vertical. To overcome this waste of light in the horizontal direction, it has long been customary to provide reflectors intended to direct the rays downward.

The inventor's idea, practically stated, is to flatten the coil, and also flatten the end of the globe or bulb so that the greatest intensity of light shall be thrown downwardly. The filament is coiled in a form which presents a loop that is elongated transversely of the axis of the lamp, or in other words, the loops are substantially elliptical, the major axes being transverse to the longitudinal axis of the lamp. The globe is likewise flattened at its tip end so that the glass wall is substantially parallel with the lower lines of the filament loops when the lamp is suspended from above. This prevents, to a great extent, the refraction of the rays of light, allowing them to pass perpendicularly through the glass.

Hardening Metals.

A new process for hardening metal has been patented by Mary J. R. Greenman, of Wilkes Barre, Pa., and relates to either precious metals, copper, or iron. The ingredients employed for carrying out the process are charcoal, bone-dust, sulfur, sal-ammoniac, sugar, salt, magnesia, borax, potash, arsenic, sweet spirits of niter, and sulfuric acid.

The method of employing the process is as follows: prior to adding the niter and sulfuric acid, all of the solid ingredients above set forth are pulverized, and thoroughly mixed or commingled. These ingredients are then placed in a retort, and the copper or other metal to be hardened is embedded therein, so as to be entirely covered by the same. Spirits of niter diluted with about equal parts of water is poured upon the mass, so as to moisten the same, and then sulfuric acid diluted with about equal parts of water is poured on. The vessel or retort is then closed and heat slowly applied, the same being increased gradually. At the end of about five or six hours, the mixture will be found to have been fused into a gray slag and the carbon of the ingredients to have become absorbed in the metal, and the hardness of the metal will be found to have greatly increased.

For the purpose of tempering cutlery-steel, the above mentioned ingredients are employed, with the exception of the charcoal and bone-dust. To the ingredients used, about five gallons of distilled water are added, which dissolves all of such ingredients with the exception of the sulfur and magnesia, which, being insoluble in water, settle to the bottom of the receptacle in the form of a sediment. The steel is heated to a cherry red and plunged into this bath, and when drawn out it will be found to be hardened. Then the temper is drawn to the depth of the edge required, and the metal ground and polished.

Asbestos Coated Rubber.

A new tubing consists of ordinary india-rubber, coated with an asbestos covering. For industrial purposes, laboratories, etc., where wear and tear are encountered, the asbestos is painted with green fire-proof paint, which protects the coating from abrasion. Apart from preserving its pliability, the tubing retains in a measure its longitudinal elasticity, as the asbestos sheathing is plaited, and the strands allow a certain movement. Burners with rubber tubes of this sort may be placed on stoves and other heating apparatus. The pipes with metallic spirals were originally made with the same object, but they are hard and inclined to break; and once leaky, they cannot be mended.

A New Flying Machine.

J. P. Reid, an inventor of Elizabeth, N. J., has completed an air-ship which has been placed on exhibition in that city. His flying machine is fifteen feet long. It carries two aeroplanes, having a surface of 365 square feet. The weight of the machine is twenty-three pounds, and it is intended to carry a weight of ten pounds and fly over a mile course. It is worked by four vacuum tubes, and by a steam turbine, which furnishes power to a two-blade propeller. Its owner intends to put it on exhibition at the World's Fair in St. Louis in 1904, and will enter it in the class to compete for the \$2,500 prize. This class includes all air-ships not carrying an operator.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE, which keeps inventors and manufacturers posted in the art in which they are mostly interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies for \$1.50.—Please give correct data in ordering.—Address

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Cigar cutter.....J. H. Bowen
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Clock. Electric.....W. F. Winslow
Clock. Electric alarm.....A. V. Strait
Cloth clamp for textile machinery.....I. F. Peck
Cloth cutting machine.....J. B. Gury
Clothes line reel.....M. H. Kemper
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Clutch. Friction.....L. J. Harris
Clutch mechanism.....F. W. Montgomery
Coal ramming and transfer apparatus.....J. F. Wilcox
Coaster brake.....G. F. Barton
Coat and hat lock.....G. E. Allen
Cock. Plug.....L. J. Bordo
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Combination lock.....J. W. Gonc
Compound engine.....J. H. Wescott
Converter.....W. J. Knox
Converter or furnace lining.....W. J. Knox
Converters or furnaces. Forming the lining of.....W. J. Knox
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Conveyer. Screw.....J. A. Mitchell
Conveying apparatus.....T. S. Miller
Cooker. Steam.....C. H. Amidon
Cooler or condenser.....J. Schneible
Cooling apparatus.....W. Griesser
Cord adjuster.....D. M. Carr
Cork and dropper. Combined.....W. Keuffel
Corn sheller.....O. E. Davidson
Corner strip.....W. N. McDonald
Corpse cooler.....S. A. Boucher
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Cotton press.....W. H. Meem
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Counter. Word.....C. W. Price
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Culinary vessel.....C. Grothe
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Electric switch.....G. H. Hill
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Elevator..... S. R. Harris
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Fence wire fastener.....G. H. Wright
Fertilizer distributor.....J. R. Ayers
File. Document.....W. S. Ebbets
Filing case. Card.....F. W. Tobey
Filter.....G. F. Goddard
Fish or meat in cans. Machine for salting.....J. Kellington
Fish trap.....P. M. Benseth
Fishing float. Self-striking.....C. Hymers
Flue cleaning cutter. Rotary.....C. B. Easty
Fluid pressure brake.....T. J. Leabo
Flushing apparatus. Closet.....C. H. Rollins
Folding screen.....J. Kaufman
Foot. Tree.....A. D. Tyler, Jr
Forage press.....J. Ferrier
Fruit jar.....D. Ray
Fruit or vegetable protector.....I. C. Putnam et al
Fuel. Artificial.....W. A. Koneman
Fuel block or briquet.....F. Chailly
Fuel briquet. Artificial.....W. A. Koneman
Fuse. Electric.....F. Brueggeman
Fuse for explosives. Electric.....F. Schroeder
Game.....A. A. Caille
Game apparatus.....G. W. Griswold
Game device.....H. G. Higgins
Garden implement.....H. H. Jensen
Garment supporter.....H. C. Hine
Gas engine.....E. G. Shortt
Gas engine.....W. J. Wright
Gas furnace.....T. P. Shaw et al
Gas generator. Acetylene.....P. P. & J. J. Reynolds
Gases or vapors. Apparatus for reducing the temperature of.....2 pats.....F. L. Dyer
Gear. Electromagnetic transmission.....H. A. Earle
Gearing.....J. R. Carter
Glass grinding machine.....W. McLaughlin
Glass working machine.....I. W. Colburn
Gold and sulfurets. Saving fine.....F. M. Graham
Grain drill.....J. A. Royster
Graphite, making.....E. G. Acheson
Gun. Machine.....H. H. Kryger
Hammer.....J. J. Green
Hammer and wrench. Combined.....C. J. Maggard
Hammock and support.....H. A. Manning et al
Harvester.....G. W. Haines
Harvester.....L. E. McCahan
Harvester. Corn.....reissue.....D. E. Anthony
Hat fastener.....D. M. Plantz
Hat pin retainer.....C. E. Stubbs
Hav cap.....G. W. Simons
Hay press.....R. L. Woodruff
Hay retarding device.....H. Green
Hay tedder.....E. D. & O. B. Reynolds
Heater section or radiator.....C. H. Palmer et al
Hide scraping machine.....M. Conway
Hoisting and conveying apparatus.....M. A. & O. W. Callahan
Hoisting and dumping device.....C. Jackson
Honeycomb uncapping machine.....A. C. Miller
Hoof pad.....E. W. Powers
Horseshoe.....W. B. Merck
Hose supporter.....W. S. Hunkius
Hub.....J. G. Westbrook et al
Hub and axle for bicycles, &c. Elastic.....F. Schmitz
Hub spindle and thimble. Combined.....S. Gregory
Hub. Wheel.....G. Kesselring
Incandescent burner.....T. M. Jamison
Incubator.....L. P. Meister
Index rod. Card.....D. E. Hunter
Insulated joint for track circuits.....S. P. McGough

Insulated rail joint.....M. J. Greeney
Insulated rail joint or connection.....J. H. Allen
Insulating coke ovens, &c. Means for.....M. Updike
Iron bearing substances. Briquetting.....2 pats.....J. H. Long
Ironing board adjustable clamping device.....F. Artos et al
Irrigating. Check blocker for.....F. W. Smith
Jar, can, &c. closure.....J. W. Farnoff
Jar closure.....H. F. Webb
Jar closure.....R. E. Meyer
Knife polishing machine table.....A. Gronvold
Labeling machine.....F. C. H. Strasburger
Labeling machine printing attachment.....F. C. H. Strasburger
Lamp.....2 pats.....R. M. Dixon
Lamp dome support.....R. M. Dixon
Lamp globe support.....R. M. Dixon
Lamp. Incandescent oil.....E. E. Flora
Lamp socket. Incandescent.....W. A. Church
Leather staking machine.....W. H. Moore
Ledger. Loose leaf.....E. B. Goodman
Ledger. Self indexing.....S. B. Kirtley
Leg. Artificial.....J. A. Peer
Linotype leader.....B. Cole et al
Liquid fuel spraying apparatus.....J. D. Swenson
Liquid meter.....J. C. Anderson
Liquids. Receptacle for containing and administering volatile.....C. L. Gebauer
Lock.....G. De Cesare
Lock.....R. L. Kirk
Lock.....C. Bayer
Locomotive boiler.....J. S. S. Fulton
Log cars. Automatic toggle chain release for.....W. Ashcraft et al
Loom picker staff check.....R. & W. Riding et al
Loom shedding mechanism.....A. C. Fischer
Looms. Filling carrier receptacle for filling replenishing.....C. F. Roper
Lubricator.....J. H. Deare et al
Lunch box. Heated.....B. R. Skinner
Measuring and filling apparatus.....A. C. Wright
Measuring instrument. Liquid.....G. Schirmer
Metal cutting roll. Expanded.....O. Bradford
Metal dressing machine chute.....F. P. Stiker et al
Metal shears.....I. Morris
Metallurgical furnace.....P. Meehan
Metallurgic furnace and precipitating water tank. Combined.....G. Bryan
Molding machine.....E. E. Punzelt
Monoline machine.....W. W. Wotherspoon
Motive power generating apparatus.....L. D. Copeland
Mowing machine. Grass or grain.....C. F. Ritcher
Music leaf turner.....G. H. Straight
Musical instrument.....R. F. Flemmings
Musical instrument automatic playing attachment.....H. M. Salyer
Musical instrument pegs. Holder for stringed.....S. A. Gregg
Musical instrument. Stringed.....W. Gabrielson
Musical instruments. Pneumatic motor for mechanical.....H. F. Hall
Nail forming machine.....T. Gare
Nut lock.....B. R. Swords
Oil from fish livers. Extracting.....A. S. Hamilton
Oil separating apparatus.....E. M. Thacker
Oiler. Machine or engineer.....G. J. Kraushaar
Optometer.....E. Clarke
Ore roasting furnace. Revolving.....P. Naef
Ore separator.....2 pats.....A. H. Stebbins
Organs, &c. Treadle for.....J. Wieser
Oven.....H. S. Welker
Oven. Portable.....J. R. Carter
Owner of lost articles, &c. Ascertaining the.....C. Geigenmuller
Oyster tongs.....C. K. & W. T. Shaw
Packing. Piston rod.....R. P. Vivian
Packing. Piston rod.....J. Neptune
Pans, kettles, &c. Scraper for.....J. W. Crawford
Paper bag machine.....J. West
Paper hanger's kit.....P. H. Clinton
Paper pulp screen.....J. A. Decker
Paste holder.....E. Pomeroy
Paving material. Utilizing old.....W. H. Lober
Paving plant. Portable asphalt.....G. & H. Merriman
Pen draining device.....P. D. Horton
Penholder.....E. E. Blakeslee
Petroleum, sulfuric acid, and lime. Manufacturing a solid combustible from.....J. C. Berntrop et al
Photographic plate holder slide.....J. A. Robertson et al
Photographic printing frame holder.....T. E. Deckard
Piles. Driving.....C. SooySmith
Pin.....G. W. Dover
Planter. Potato.....T. L. Good
Planting machine.....G. W. Jarmin
Plate or plaque hanger.....J. E. Larkin
Playing ball.....6 pats.....F. H. Richards
Plow.....J. W. Barnes
Plow adjusting device. Wheel.....W. B. Michael
Plow fertilizer distributor attachment.....C. T. Thomas
Pneumatic despatch tube terminal.....F. R. Taisey
Pocket book.....J. Goerk
Power transmitter.....S. Engle
Precious metals from their ores. Apparatus for use in extracting.....H. Smith et al
Printer's quoin.....E. L. Anslinger
Printing machines and mechanism for controlling same. Paper carriage for type.....R. A. Fowden
Printing. Make ready for.....A. S. Allen
Printing plates. Means for securing.....H. Hamlin
Printing press. Movable chase.....D. E. Hunter
Printing surfaces. Manufacture of.....O. Foerster
Projectile.....E. J. Hill
Projecting apparatus.....H. M. Reichenbach
Propeller. Reversible.....S. W. Thaxter
Pulp vessels. Apparatus for making closed.....F. B. Howard
Pump. Suction.....D. Schurman
Putting out machine.....J. H. Bickford et al
Puzzle.....P. Reichardt
Railway block signaling system.....W. M. Chapman
Railway or tramway. Electric.....G. F. Cornwallis-West
Railway switch.....A. Strom

Railway tie.....S. J. Gibboney
Railway tie. Cement.....W. J. Bell
Railway trains. Apparatus for electrically lighting.....A. B. Gill
Railway water tank attachment.....R. T. Cummings et al
Ram. Hydraulic.....J. Richards
Refractory material and manufacturing same. Object of.....C. E. Jacobs
Remedy for diseases of the skin or scalp and making same.....R. C. Robertson
Roasting furnace.....D. Sheedy et al
Rock drill.....A. Avery
Rock drill.....A. D. Foote
Rolling mill catching machine.....R. Harris
Rope climbing device.....C. E. Knop
Rotary engine.....W. A. E. Heurici
Rotary engine.....C. H. Taylor
Rotary engine.....F. G. Bates
Rotary engine.....W. Lawrence
Rotary engine.....E. B. Tree
Rotary engine.....V. A. Rice
Rotary engine.....C. E. Shumway
Rotary mechanical drier.....W. W. Wallace
Rotary steam engine.....W. P. Holman
Safe or lock box. Wall.....H. C. Lowrie
Salt or feed for cattle. Device for holding blocks of compressed.....H. A. Michelson
Sand drier.....G. & H. Meriman
Sash fastener.....E. A. Sacket et al
Sash lock and adjuster. Window.....L. Petraccione
Saw. Circular hand.....M. V. Grogan
Saw filing and setting device.....H. D. Sharp
Saw set.....O. R. Johnson
Scaffold. Painter's or decorator's.....E. A. Carman
Score indicator.....H. H. Norrington
Scraper. Wheeled.....J. C. Stubbs
Screw driver. Ratchet.....A. D. Leblanc
Sealed jars. Exhausting and closing hermetically.....W. A. Lorenz et al
Sealing apparatus. Jar.....3 pats.....W. H. Houiss
Sealing apparatus. Jar.....2 pats.....W. A. Lorenz
Sealing apparatus. Jar.....B. Arkell
Sealing apparatus. Jar.....W. A. Lorenz et al
Sealing machine. Bottle.....H. T. Gay
Seed cracking and disintegrating mechanism. Cotton.....J. C. W. Stanley
Separator.....3 pats.....R. W. Jessup
Sewing machine. Overseaming.....S. Borton
Shade support. Window.....L. Dalbert
Shaft coupling. Compression.....W. W. Carey
Shoe holding device.....A. R. Edwards
Show case.....F. Pollard, Jr
Shutter fastener and bower.....G. C. Bolgiano
Sieve cleaner.....R. F. Snyder
Sight bars. Locking catch for extendible.....O. C. Horney
Signaling system.....2 pats.....H. Shoemaker
Signaling system. Electric.....F. K. Fassett
Signaling system. Wireless.....H. Shoemaker
Signaling system. Wireless.....G. W. Pickard
Signaling system. Wireless.....H. Shoemaker
Signaling system. Wireless.....H. Shoemaker
Signaling system. Wireless.....H. Shoemaker
Signaling to or communicating with ships. Means for.....L. Daft et al
Singletree attachment.....M. A. Pike
Singletree clip.....E. Weaver
Skirt and shirt waist fastener.....L. M. Browning
Slicer. Potato.....W. H. Weaver
Smoke consuming furnace.....J. A. McAllister
Soap cake.....W. Berry
Soap cake. Antiseptic.....E. Klein et al
Soap saving device.....D. Rothschild
Soda water fountain.....E. J. Calley
Sole. Adjustable clump.....A. S. Hartrick
Spike drawer or extractor.....G. F. Pearson
Spindle driving mechanism.....H. W. Bracken
Spring seat.....E. A. Hoefler
Stacker hood. Pneumatic straw.....G. M. Mitchell
Stair rod and fastener.....S. L. Stuver
Stamp device. Postage.....A. H. Pitney
Steam boiler.....H. K. Hess
Steam from hot slag, &c. Generating.....G. Mitchell et al
Steam generator. Slag.....2 pats.....L. D. Copeland
Steam generator. Slag.....2 pats.....G. Mitchell
Steam trap.....C. H. Atkins
Stone composition. Artificial.....H. Mielck
Stone. Manufacturing.....J. C. McLenahan
Stone molding machine. Artificial.....N. F. Palmer
Stone. Producing artificial.....H. Mielck
Stove.....C. A. Richardson
Stove. Gas.....H. Eldridge
Stove hot air attachment.....J. C. Kinley
Stove. Hot blast.....S. T. & C. H. Wellman
Street sweeper and dirt conveyor.....P. F. Renaud et al
Stringing tool.....H. H. Cummings
Stringing tool.....E. W. Putnam
Stuffing box with metallic packing.....J. Prusek
Subway.....N. F. Palmer
Sugar juice by means of electrolysis. Purifying.....A. Baudry
Suspenders.....H. C. Hine
Sweater.....H. Starr
Swinging gate.....W. J. Holland
Switch.....A. E. James
Tap and die holder.....F. C. Tyler
Tapping device. Beer barrel.....J. Holbach
Telegraphy. Wireless.....H. Shoemaker
Telephone systems. Message transmitting and recording mechanism for.....W. F. Smith
Telephone transmitter.....M. R. Hutchison
Testing and vending machine. Coin controlled.....A. Stewart
Theatrical lighting.....G. E. Stephenson
Tin folding machine.....P. A. Kunold
Tire and fastening. Vehicle wheel.....A. L. Stevens
Tire. Pneumatic.....R. Fleischer et al
Tire. Rubber.....C. W. Harris
Tires upon wheel rims. Machine for securing rubber.....J. R. Place et al
Tobacco stemmer.....J. O. Morris
Tool. Fluid pressure operated.....C. H. Johnson
Toy.....S. Sparrow et al
Toy vehicle motor.....H. T. Kingsbury
Toy whistle.....J. Zilkie
Trace fastener.....C. Nagel
Tramway. Wire rope.....W. C. Davis
Transit apparatus. Sending apparatus for tubular.....B. H. Blood
Transmitting intelligence.....3 pats.....H. Shoemaker
Trolley.....E. W. Clark
Trolley. Electric railway.....C. E. Thomas et al

Trolley retriever.....A. W. Knutson
Truck bolster. Car.....R. H. Hornbrook
Truck. Elevating.....2 pats.....A. A. Scott
Truck. Steam.....W. H. Knight
Trunk.....W. Hossfeld
Tube blank forming machine.....W. S. Seymour
Tubes. Manufacture of.....W. S. Seymour
Tufting machine.....W. E. Buser
Typewriter.....J. A. Smith
Typewriters. Ribbon shifting attachment for book.....J. E. Poage
Umbrella runner retainer.....W. P. Maxwell
Undergarment.....F. J. Prue
Valve.....H. E. Keyes
Valve.....S. George
Valve and alarm. Fluid operated stop.....B. M. W. Hanson
Valve. Expanding gate.....L. A. Riegler
Valve. Gate.....E. H. Lunken et al
Vave. Hydraulic balanced.....D. W. Porter
Valve. Self closing.....E. Schlaepfer
Valve. Self closing antiwater hammer balance.....2 pats.....F. & F. H. Engelhard
Vehicle frame. Motor.....A. L. Ricker
Vehicle. Motor.....W. Norris
Vehicle spring.....J. Bratsing
Vehicle spring coupling.....H. K. Pell
Velocipede crank shaft and hanger.....E. G. Latta
Velocipede. Railway.....O. J. Donovan
Vending apparatus. Automatic liquid.....S. Newman
Vise attachment.....B. M. McMahon et al
Voltmeter scale.....W. C. Baker
Wagon body lifter.....C. W. Nabb
Wagon. Coasting.....H. E. Keyes
Wagon jack.....G. J. Carr
Wagon or tank lining. Grain.....C. I. Bostwick
Wagon standard.....G. Mock
Wagon stock and hay rack combined.....C. H. Williams
Washboard.....P. C. Barton
Washing machine.....E. L. Howe
Washing machine.....H. J. Lockhart
Water closet for conveyances.....D. H. Murphy
Water closet or urinal.....J. Stewart
Water cooler.....C. A. Tatum
Water pressure regulator.....A. E. Burnett, Jr
Water purifying apparatus.....L. Gathmann
Wave detector.....L. T. Rhodes
Welding aluminium.....M. W. Emme
Well casings. Tool for withdrawing.....S. Bennison
Winding engine drum reversing device.....H. N. Covell
Windmill.....C. Wells
Windmill.....I. Benjamins
Windmill head.....F. E. Benedict
Window.....J. L. Stieglitz
Window.....E. A. Sanders
Wire gripper.....J. W. Angle
Wire guide. Hydraulic.....J. J. Warren
Wire machine. Barb.....J. E. Fredrick
Wood impregnating apparatus.....W. L. Smith
Wrench.....M. Scott
Wrench.....C. E. Greenlief

DESIGNS.

Brushes, &c. Back for.....H. A. Weihman
Lamp body.....2 pats.....A. L. Baron
Lamp body. Gas.....H. Herz
Mirrors, &c. Back for hand.....2 pats.....H. A. Weihman
Purse top, &c.....H. J. Straker
Stone. Cut.....2 pats.....S. Wood
Stool leg.....C. D. Orcutt
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Acid ester of paracresol and making same. Oxalic.....L. Kahl
Adjustable brace.....H. E. Wallis
Agricultural tool handle.....J. C. Smith
Air compressor.....F. W. Gruschow
Air feeding device.....W. Sasse
Air liquefying apparatus.....J. F. Place
Anchor.....J. Fellows
Animal shearing machine.....C. M. Palmer
Arm rest. Adjustable.....C. Zibulski
Assayer's furnace.....A. C. Calkins
Automation figure.....2 pats.....R. H. Little
Awning.....C. S. Hamilton
Bag holder.....A. P. Franden, Jr
Bag holder.....H. L. Fishback
Bake pan.....C. E. & G. M. Austin
Bale tie fastening and identification tag. Combined.....F. P. Davis
Baling press.....M. Curry
Barrel, &c. Tilting.....F. W. Keen et al
Battery plate. Storage.....N. T. Daboll
Battery plate. Storage.....E. H. Winkes
Battery plates. Supporting and lifting mechanism for secondary.....L. H. Flanders
Beam joint. Flanged.....J. Ellmore
Bearing box for shaft hangers.....W. H. Ermentrout et al
Bedstead. Extension.....R. L. Betts
Beer stopper.....G. Hirschell
Belt fastening device.....H. H. Taylor
Bevel.....C. Bodmer
Bicycle support.....J. G. Beale
Billiard or pool table cushion.....D. W. Delaney
Binder frame.....W. G. Jones
Binder. Loose leaf.....L. G. Schult
Binder. Temporary.....J. J. Duffy
Blasting.....G. Thomson
Bluing device.....E. C. Fales
Boat raising or lowering apparatus. Ship's.....A. Welin
Boiler cleaning composition.....C. Nettleton
Book edge gilding press.....W. Glenow
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Bottle filling machine.....S. C. Miller
Bottle. Non refillable.....J. V. Beugle
Bottle. Siphon.....C. L. Bastian
Bottle stopper.....S. Kemp
Bottles, &c. Machine for making.....C. Boucher
Bowling alley ball return way.....P. J. Riddell
Brake automatic slack adjusting.....E. Wilson
Brake shoe. Flange.....W. D. Sargent
Brick cutting machine.....H. L. Hix
Brush.....C. H. Tesch
Brush. Scrub.....M. Marqua
Buckle.....W. M. Warner

Building material.....A. Standau
Burial vault.....G. Bolser
Button guard or retainer.....D. Samuel
Button Spring.....G. W. McGill
Button turning machine.....J. Heinrich
Calculating machine.....J. Vermehren
Calendar.....S. D. Chambers
Camera.....A. C. Butler
Cameras, Combined door and bellows support for.....J. D. Garfield
Can opener.....W. E. Niles
Candle holder.....M. Hammerstein
Car brake.....L. C. & W. S. Johnson
Car brake.....R. H. Wakeman
Car buffer, Railway.....W. F. Richards
Car coupling.....W. N. Hensley
Car coupling.....H. May et al
Car dumping apparatus.....T. Long
Car Hand.....J. Bridges
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Car side bearing, Adjustable.....L. C. Denison
Car starting device.....F. B. Nims
Cars, Protecting rail for open.....C. E. Baltz
Carbonating apparatus, Liquid.....P. E. Malmstrom et al
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Carbonating or other machines, Automatic solution feeder for.....C. L. Bastian
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Carburetor, Explosive engine.....J. B. & D. M. Leppo
Card, Score.....F. X. J. Hart
Cardboard or paper edges, Crimping, burnishing, and hardening.....C. H. Fernald
Cards from paper stock, Die for cutting.....F. K. Arnold
Cartridge and shell loader.....P. Klingner
Cash receptacle for mechanical cashiers.....I. S. Dement
Casing or tubing, Adjustable grip elevator for.....C. L. Smith
Cattle guard gate.....J. Jackson
Chair seats, Making.....H. B. Morris
Cheese knife.....M. W. Miracle
Child's seat.....J. Claflin
Chimney cowl.....C. O. Hine et al
Cigar measuring and cutting gage.....D. Palmgren
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Clip.....L. F. Bogia, Jr
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Clothes pin.....S. G. MacMillan
Coat hanger.....O. Crawford
Coke and the recovery of gases therefrom, Apparatus for the manufacture of.....T. S. C. Lowe
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Commutator, Electric.....W. Loewen
Compressor.....F. Wittenmeier
Concrete mixer.....H. J. Phillips et al
Connecting rod.....H. M. McCall
Controlling device.....T. P. Ford
Conveyer, Bucket.....R. W. Christian
Conveyer driving mechanism.....W. J. Sweetser
Cooking utensil.....A. E. Bronson, Jr
Cooking utensil.....J. F. Ferry
Cow tail holder.....F. S. Weed
Crank, Adjustable.....H. Janssen
Crate, Shipping.....C. Kempf et al
Crucibles, Recharging smelters'.....G. B. Brown
Crucibles, Shield and funnel for recharging.....G. B. Brown
Cue.....W. S. Lyon
Cultivator, Riding.....S. H. Tinsman
Cycle support, 2 pats.....R. F. Corneil
Cylinders and valve chests to saddles, Means for securing.....S. M. Vaulchain
Damper for stoves, ranges, &c.....N. Burdick
Dead centers, Device for overcoming.....A. B. Grider
Desk bracket.....A. R. Fergusson
Dental purposes, Electric heater for.....J. Cook et al
Diseases, Apparatus for treatment of.....W. T. Wells
Display stand.....B. Zimmer
Dock, Floating.....J. E. Blackwell
Door check.....J. R. Beck
Door check.....H. G. Voight et al
Door check, 2 pats.....S. P. Watt
Door check and closer.....F. H. Rolfe
Door structure, Revolving.....T. Van Kannel
Draft equalizer.....W. H. Shell
Draft evener.....H. A. Te Poel
Draft gear, Friction.....J. Timms
Draft rigging.....P. M. Carty
Drafting garment patterns.....E. J. Curran
Draw press.....W. Langbein
Drill stock, Machine.....L. Gassard
Drop gate.....A. List
Dust collector.....E. R. Draver
Dust guard.....H. C. McCarty
Educational device.....C. Erwin
Educational device.....C. S. Osborn
Electric circuit controller, Automatic.....J. Sachs
Electric motor for vehicles.....H. G. Osburn
Electric motors, Means for regulating.....R. Lundell
Elevator.....C. W. Kirsch
Engine sparking mechanism, Gas.....E. S. Bowen
Enumerating machine.....H. Hodsdon
Ether, Manufacture of.....J. W. Harris
Evening and grading machine.....E. P. Hill
Explosive engine.....J. F. Hill
Eyeglasses.....R. Riser
Faucet.....B. Woodnall
Faucet, Self closing.....G. A. Blake
Faucet, Self closing.....G. A. Blake
Faucet, Self closing.....N. B. Gossard
Fence, Wire.....F. R. Longstreet
Filling machine, Receptacle.....C. H. Rounds
Filter.....G. Scholl
Filter attachment.....W. T. Erickson
Filters, waterworks, &c. Indicating device for.....C. L. Parmelee
Fire engines, Signal installation for.....J. H. Deters
Fire extinguisher, Automatic.....J. B. Miesse
Fire extinguisher valve, Automatic.....C. W. Kersteter
Fireproof windows, Self closing sash for.....C. D. Pruden
Fish trap, Floating.....A. C. Burdick

Flier.....F. H. Martin
Flue expander.....A. Munch
Fly paper protector.....H. R. Sieverkropp
Focal plane shutter.....L. J. R. Holst et al
Folding table.....A. F. C. Garben
Food chopper.....H. O. Evans
Fruit dipping machine.....W. K. Allen
Fuel blower and pulverizer.....M. F. Williams
Fuse.....F. B. Cook
Fuse box.....J. C. Stewart et al
Game and game table.....O. Prybil
Game board, Horseshoe.....C. J. Dorsey
Garment.....H. Loewenbach
Garment, Skirted union.....L. J. Niedner
Gas battery.....O. Britzke
Gas generator, Street lamp.....E. B. Ludwig
Gauntlet.....G. R. Fortescue
Glass blowing machine.....W. H. Terlinde
Gloves, &c. Fastening device for.....J. D. Stirkler
Go cart, Folding.....A. M. McLellan
Graphophone, Multiple.....T. H. Macdonald
Granary, Portable.....D. W. Caswell
Grinding wheel.....J. W. Forster
Grubbing machine.....J. Bloodgood
Gun sight.....P. Junod
Guns having recoil barrels, Means for installing the recuperating springs in.....O. Behnke
Hammer, Foot power.....T. Hicks
Hammock support.....W. H. Morehouse
Handcuffs.....C. L. Mealer
Handle.....G. B. M. Buzzell
Heating furnace.....C. D. Hazard
Hinge.....A. B. Clark
Hinge, Swinging window.....G. H. Parker
Hinge washer, Antifriction.....E. A. Moore
Hog ringer.....E. E. King
Hoisting apparatus.....A. E. White
Hoisting bucket.....C. M. Gearing
Hook and eye.....W. H. Collins
Hook for attaching hose supporting pads.....M. H. Eiseman
Hopper gate and operating mechanism therefor.....C. O. Johnson
Horseshoe pad.....D. Conroy
Hose coupling and automatic valve.....W. H. Keller
Hose supporter.....K. M. Johnson
Hot water heater.....J. A. Jacobson
Hot air heater.....W. P. Hartford
Hub attaching device.....I. F. Wood
Hub, Vehicle.....J. C. Bledsoe et al
Hydraulic or liquid motor or pumping apparatus.....F. E. Herdman
Hydrocarbon burner.....B. N. Hawes
Hydrocarbon burner, Liquid.....C. F. Jenkins
Ice saw.....A. Blanchard
Induction coil.....C. Stein
Ink well, Automatic.....A. M. Tyler
Insulator.....C. Robert
Jewelry, Means for forming claws in articles of.....W. H. Ford et al
Journal box oil guard.....F. Hachmann
Key.....A. H. Wormald
Knob attachment.....S. Fader
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Lamp carbon holder, Electric arc.....J. A. Heany
Lamp, Desk.....A. R. Fergusson
Lamp, Hunter's.....R. C. Kruschke
Lamp, Incandescent.....L. S. Pfouts
Lamp, Incandescent electric.....J. J. Rooney
Lantern holder.....H. H. Hutchins
Lathe alignment gage.....W. C. Fox et al
Leather strap cutting machine.....W. F. Murphy
Ledger leaf.....W. G. Jones
Level attachment, Spirit.....W. Owens
Lid supporting device.....J. M. Butcher
Lifting jack.....C. Mykolashuk
Linotype machine trimming mechanism.....F. J. Wich
Liquid supply apparatus.....E. T. McKaig
Liquid under pressure, Machinery for the production of.....A. Vogt et al
Listing machine.....L. Matthews
Lock.....F. A. Richardson
Locket.....F. C. Miller
Locomotive deobstructor.....E. P. Hollis
Log raft.....A. F. Griffiths
Loom filling replenishing mechanism.....C. F. Roper
Loom jacquard.....G. Hove
Loom picker stick check device.....M. Dumont
Looms, Thread parter for filling replenishing.....C. F. Roper
Lung testing machine.....E. Donne
Mail pouch.....J. H. & P. J. Hutton
Matrix making machine.....G. B. Shepard
Measuring and drafting device for garments.....A. Adleberg
Measuring instrument.....T. S. Tilley
Meat needle and larder.....T. H. Means
Meat pounder.....reissue.....M. Peters
Mechanical movement.....F. E. Herdman
Mercerizing apparatus.....P. Hahn
Metal crimping machine.....H. B. Irvin
Metal dressing machine carrier.....F. P. Stiker et al
Metal working machine feed mechanism.....B. M. W. Hanson
Metals from their ores, Reducing.....M. Ruthenburg
Metallic hoop for vessels.....J. R. Bostwick
Metallic tie and rail fastener.....G. T. Abel
Mining machine.....R. E. Noble
Molding and compressing machine.....A. Sendlein
Molding, Metallic strip.....D. Reym
Musical instrument.....F. J. Hepe
Musical instrument, Mechanical.....E. C. Phillips
Necktie holder.....E. Armstrong
Numbering machine.....C. B. Post
Nut lock.....D. G. Horton et al
Nut lock.....F. Cavallaro
Nuts, &c. Machine for facing.....C. W. James
Oar lock.....L. H. Bullard et al
Ore concentrator.....L. Look
Ore grading apparatus.....F. W. Wood
Packing.....P. J. Flinn
Packing, Metallic piston and valve rod.....A. J. Cunningham
Packing, Plastic homogeneous.....C. H. Jaeger
Padlock, Permutation.....I. Williams
Paper watermarking device.....E. R. & O. F. Behrend
Parcel gripper.....G. D. Hermann et al
Paste receptacle.....A. N. Ritz
Paste receptacle and brush.....A. N. Ritz
Pen, Fountain.....N. C. Stiles

Pen extractor.....H. H. Lewis
Photograph and making same, Color.....M. & H. M. Miley
Photographic film spool.....J. T. Clarke
Photographic plate holder.....R. Schuttauf
Photographic printing apparatus.....A. F. Hewitt
Piano players, Fastening for mechanical.....J. A. Smith
Plate holder, Magazine.....K. Michaelis
Playing ball.....H. S. Chapman
Playing ball.....E. Kempshall
Playing ball, 2 pats.....F. H. Richards
Plow.....B. G. Reeves
Plow land gage attachment.....V. T. Gilchrist
Pneumatic tool.....W. M. Holden
Pocket books, &c. Trimming or binding for.....F. Dostal
Pole, Vehicle.....B. W. Berry
Printer's quoin.....A. Cox
Printing and folding machine.....W. Scott
Printing cylinder.....W. W. Grier
Printing press bed motion.....H. Hart
Printing press feed gage.....E. L. Megill
Printing, Silk.....M. Ducat et al
Propeller, Steering.....V. Sjostrom
Pulley, Catch.....A. H. Hoyer
Pump, Deep well.....A. J. Webster et al
Pump, Double action.....E. Byars
Pumping engine, Steam.....J. A. Groshon
Pumping water under hydraulic power, Means for.....J. D. Hobbs
Pyrometer.....E. H. Earnshaw
Rail joint.....N. F. Anderson
Rail joint.....R. Weir, Jr
Rail joint.....N. P. Park
Rail joint.....J. Haslsteiner
Rail joint.....A. Howard
Rail testing apparatus.....F. Stahl
Railway coupling.....W. T. Van Dorn
Railway rail joint.....L. T. Wever
Ramie china grass, &c. Treatment of.....C. Masse
Retort for subliming sulfur.....A. Alonzo-Consoli
Revolution indicator.....E. & E. J. Lavins
Rolling mill.....K. Mengelbier
Rope guide.....W. G. Poulson
Rotary engine.....M. W. Wallace
Rotary engine.....C. M. Agnew
Rotary engine.....A. A. Methven
Rule.....J. A. Traut
Satchel, Folding.....J. Trevethan
Saw clamp.....W. B. Thomas
Scalper and bolter.....G. R. Davidson
Scissors or shears.....J. P. Jackson
Screw threading trenails, &c. Machine for.....A. Collet
Seythe snath fastener.....R. B. Edwards
Seeding machine furrow opener.....J. S. Heath et al
Set apparatus.....L. B. Gurley
Sewed warp fabric.....J. W. Hyatt
Sewing machine.....H. C. Peters
Sewing machine brake.....T. Stankewicz et al
Shade guide, shield, and curtain pole bracket, Combined window.....M. A. Allen
Shade roller.....C. H. Bridgen
Shade roller support.....B. McKenzie
Sharpening band cutter knives, Machine for.....H. C. Jacobs
Sheet metal bending or flanging machine.....A. E. Chambers et al
Sheets to be punched and for releasing same, Adjuster for retaining.....F. Sutherland
Shell support.....C. Chmelitzek
Shingle machine.....G. W. Roper
Show case bracket.....G. C. Wright
Shutter lock.....J. A. Cook
Sign, Illuminated.....H. S. Kemp
Sign, Portable electrically illuminated.....H. S. Kemp
Signaling apparatus, Electric.....A. F. Hauss
Sink and connection therefor.....E. A. Fountain et al
Siphon head.....C. L. Bastian
Skid.....E. B. Richardson
Smokeless combustion furnace.....C. Wegener
Smoking pipe.....R. N. Barger
Snap hook.....A. R. Clarke
Soap boiling and finishing machine.....L. Gottschalk
Soap plotting machine.....L. Gottschalk
Soap saver.....P. Leoni
Sodium cyanid, Making.....F. Roessler
Soldering iron heater.....M. J. Nash
Spinning frame.....F. A. Breeze
Splice bar.....F. Lieske
Stave tapering machine.....W. H. Voss
Steam boiler.....R. M. Downie et al
Steam boiler.....D. P. McQueen
Steam boiler.....W. Hopkins
Steam engine.....P. H. White
Steam heater.....B. K. Hussey
Steam trap.....F. Cornwell
Stoker, Mechanical, 2 pats.....E. McConnell
Storage battery.....F. Sedgwick
Storage battery.....D. E. Wiseman
Stove, Heating.....J. W. Heuer
Street sweeper.....W. S. Thorp
Sugar, Purifying and preserving raw.....M. Weinrich
Syringe thermometer attachment, Fountain.....F. King
Tabulating machine.....D. E. Felt
Tabulator.....F. Rabinovitz
Tackle block.....A. B. Tarbox
Tank.....H. Bradshaw
Telautomotor.....H. Shoemaker
Telegraph paper, Machine for producing perforated.....G. H. Hackett
Telephone inclosure, 2 pats.....A. J. Parke
Telephone receiver.....W. M. Miner
Telephone switchboard plug.....H. P. Clausen
Telephone transmitters or speaking tubes, Mouthpiece for.....J. W. Brown
Textile covered molds, Machine for making.....G. W. Swift, Jr
Thill coupling antirattler and bolt lock.....J. G. Leshner
Thread cutting attachment for spools.....F. E. Norton
Threshing machine feed apparatus.....W. Schaefer
Ticket case.....J. G. Warner
Tile floor, Inlaid.....E. M. Henderson
Tire tightener.....W. M. Lottridge
Tire tightener.....H. P. Hill
Tobacco, Device for forming continuous rolls of.....E. Merkert
Tobacco extract and nicotin, Obtaining.....C. F. Gloystein

Tobacco tags, Machine for forming and applying.....H. D. Seekamp et al
Tool dismounting instrument.....M. Steudner
Toy, Dancing.....J. Travis
Trace book.....C. H. & A. D. Grant
Traveling bag protector.....G. B. Rubens
Tree felling apparatus.....W. P. Kidder
Truck, Street car.....R. H. Hornbrook et al
Tuck comb.....J. A. Stiles
Typewriter.....H. Kochendorfer
Typewriting machine.....J. Moore
Unloading apparatus.....F. H. Kindl
Unloading mechanism, Vehicle.....V. R. Browning
Vacuum pan.....M. Ekenberg
Valve.....R. Meyer
Valve.....W. A. Smith
Valve, Float.....J. L. Mayfield
Valve operating mechanism.....J. C. Humphreys
Valve, Retaining.....W. G. Lamb
Valve, Water heater controlling and reversing reissue.....F. W. Robershaw
Vapor burner, Incandescent.....L. S. Pfouts
Vaporizer, Formaldehyde.....J. W. England
Varnish, Manufacturing.....A. L. Tedesco
Vault cover.....J. Armstrong
Vehicle construction.....E. H. Phipps
Vehicle, Ice.....F. H. Ober
Vehicle running gear.....F. Schmitz
Vehicle spring gear.....W. L. Manning
Vending machine.....F. A. Knapp
Vise.....E. S. & B. L. Williamson
Voting machine.....J. Blocher
Wagon brake.....J. R. Johnson
Wagon, Dumping.....W. A. Shope
Wagon, Dumping.....E. P. Le Gore
Wagon for street cleaning purposes, Push.....T. Hill
Washboard.....A. H. Stockert
Washing and wringing machine.....G. McKissic
Washing machine gearing.....H. Sawyer
Watch barrel.....V. S. Corey
Watch dial fastening.....W. W. Dickerson
Water heater.....F. H. Engels
Water tube boiler.....J. E. Thornycroft
Water tube boiler.....M. H. Plunkett
Waver power motor.....D. K. Bryson
Weather strip.....B. F. Grandstaff
Weeding implement.....R. R. Briggs
Well drill, Oil or other.....W. E. Johnston
Wells of oil or gas, Automatic controller for flowing.....C. P. Estes
Whip.....D. C. Hull
Winch.....P. B. Clarke
Winding engine.....H. N. Covell
Windmill regulator.....W. E. Piper
Window frame.....K. Jorgensen
Window, Sheet metal.....C. D. Pruden
Wire rope block.....A. B. Tarbox
Wire stretcher.....O. Andrew
Wire weaving machine, 2 pats.....W. J. Wright
Work support.....B. M. W. Hanson
Wrapping machine.....O. N. Nord
Wrest plank.....L. Gassard

DESIGNS.

Bracket, Wall.....F. C. Potter
Braid.....V. Schuck
Dish, Cover.....R. L. Johnson
Hammock fabric, 2 designs.....I. E. Palmer
Lamp body.....W. Gray
Spoon, Souvenir.....E. L. Deacon

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Acid, Making formylmethylantranilic.....F. Von Bolzano
Air brake, (reissue).....J. E. Norman
Air brake.....J. B. Briggs, Jr
Adjustable switch.....E. W. Harden et al
Adjustable switch.....W. H. Rabbe et al
Advertising device.....C. E. Whitney
Agricultural rake.....A. R. Black
Alloy of silver.....W. H. Walker
Alum, Obtaining.....H. H. Wing
Amusement device.....A. T. Prescott
Animal trap.....J. E. Cox
Apron.....W. T. Jones
Armature for dynamo electric machines.....J. Burke
Atomizer.....A. H. Tatum
Atomizer.....C. A. Tatum
Automobile alarm, Pneumatic.....G. E. Cordeau
Bag or satchel frame.....F. Lau
Bale tie.....J. W. Griggs
Baling press.....P. C. Southwick
Barrel or cask.....H. P. Lemper
Battery plate separator, Storage.....R. N. Chamberlain
Bean cutter and puller.....C. H. Knapp
Bearing, Side.....C. H. Williams, Jr
Bed, Folding.....C. C. Taylor
Belt, Distributor or conveyer.....J. F. Tinsley
Belt dressing to belts, Device for applying.....W. K. Richtart
Belt holder.....G. D. Schrum
Bier, Knockdown.....W. M. Rankin
Billet heating furnace, Continuous.....H. B. A. Keiser
Binder, Temporary.....E. L. Krag
Binder, Temporary.....E. H. Barbour
Binder, Temporary.....C. C. Boykin
Blank furnace.....M. Gorham
Blower, Furnace.....H. R. Arthur
Blowpipe, Automatic.....A. C. Rosenbrook
Boiler fire boxes, Ash pan for steam.....J. W. Funk
Bolt or spike extractor.....W. C. Morrill
Bottle brushing machine.....C. F. G. Burrow
Bottle filling apparatus.....C. Hitzl
Bottle lock.....W. E. Swett
Bottle, Non refillable.....E. Barrath
Bottle, Non refillable.....M. M. Beam
Bottle, Non refillable.....J. R. De Alf
Bottle washer.....W. J. Cunningham
Bottle washing machine.....W. J. Cunningham
Bowling ball.....L. Immen
Box.....W. Fiske
Brake mechanism.....J. D. Williamson, Jr
Brick kiln air box.....J. C. Boss
Bricks for building purposes, Machine for laying.....J. H. Knight
Brush, Cylindrical.....G. F. McIndoe
Buckle, Tug.....T. H. Gardiner
Bung and faucet for barrels.....G. R. Van der Wee
Burglar alarm, Detonating.....F. M. Reynolds

- Burial tomb.....F. Zarling
 Busy test system.....D. S. Hulfish
 Button.....J. M. Marks
 Button.....W. C. Vogel
 Cable signal. Traveling.....M. Norden
 Calcium sulfate and by products. Obtaining.....H. H. Wing
 Calculating machine.....J. T. Howieson
 Camera. Divided bed photographic.....J. A. Robertson et al
 Camera. Swing back photographic.....C. E. Hutchings
 Cameras. Running bridge for extension front photographic.....C. E. Hutchings
 Can opener.....T. H. C. Lofthouse
 Candle stick or holder.....A. Tovey
 Car. Aerated.....R. M. Pancoast
 Car brake.....J. S. Sheets
 Car coupling.....J. Murphy
 Car door fastening. Freight.....H. R. Keithley
 Car door. Grain.....R. C. Johnson
 Car door winding shaft.....H. W. Wolff et al
 Car side bearing. Railway.....F. R. Cornwall
 Carbureter.....E. D. Parrott
 Carbureter.....W. Wright
 Carriage nursing bottle holder. Baby.....L. C. Feld
 Carrying roll.....E. E. Hanna
 Centrifugal separator.....P. L. Kimball
 Chain wrench.....J. D. Brown et al
 Chalk line self chalking holder.....W. C. Filson
 Check expanding pad.....T. C. Best
 Cigar wrapping table.....N. H. Borgfeldt
 Cigar wrapping table suction valve.....N. H. Borgfeldt
 Cigarette forming, wrapping, and ironing appliance.....F. J. Ludington
 Cigarettes from continuous cigarette rods. Making.....F. J. Ludington
 Clay pulverizer and separator.....J. Elliott
 Clock. Electric.....C. M. Crook
 Cloth finishing machine. 2 pats.....F. Stiner
 Clutch.....F. S. Hawkins
 Clutch operating mechanism for winding drums.....S. Bartron
 Cock. Gage.....F. W. Leidecker
 Coin receptacle.....W. J. & G. S. O'Neill
 Column capital and attachment.....C. H. Howland-Sherman
 Combing machine.....A. Wenning et al
 Commutator leads. Means for attaching.....W. F. Dawson
 Compressor valve mechanism.....J. A. Coombs
 Conveyor.....J. Roger
 Corset.....D. Kops
 Cot. Folding.....S. Pelletieri et al
 Cotton cleaner.....E. B. Ham et al
 Couch. Rocking.....J. Gluck
 Cream separator.....I. P. B. Knudsen
 Cultivator.....S. Rodriguez
 Cultivator.....S. L. Allen
 Curd mill.....J. W. Frazer
 Curtain pole.....J. A. White
 Cut out. Thermal.....M. O. Troy
 Cycle.....F. S. Willoughby
 Cycle seat.....E. J. G. Goerke
 Cylinder lock.....H. G. Voight et al
 Dentist's electrical annealing furnace.....N. K. Garhart
 Diamond cutting.....W. D. Seddon
 Die stock reaming attachment.....J. L. Thompson
 Digester.....A. Giesler
 Display device. Article.....E. Gutmann
 Distiller's spent residues. Apparatus for the treatment of.....C. G. Sudre et al
 Door.....J. L. Young
 Door holder.....A. Dilthey et al
 Dough mixing machine.....R. L. MacHale
 Draft equalizer.....H. Spunangle
 Draft preventer.....C. Barnes et al
 Dredge.....A. Z. Boudreaux et al
 Dress shield.....G. M. Grant
 Drier.....A. Giesler
 Drier for ores, &c.....A. G. Campbell
 Drying apparatus.....A. Schiff
 Drink shaker.....R. Reed
 Drinking fountain. Poultry.....R. J. Beise
 Driving mechanism.....A. M. Gloag et al
 Drum. Heating.....E. Hinderer
 Dump shovel. Hand.....J. Felton
 Dye and making same. Brown sulfur.....M. Boniger
 Dye and making same. Yellow to red acridin.....O. Sohst
 Dyeing acid colors.....C. Engau
 Dynamo. Exciting.....2 pats.....H. W. Buck
 Electric accumulator.....F. Loppe et al
 Electric accumulators. Forming.....W. Morrison
 Electric circuits. Automatic switch for fuse wires in.....E. W. Pelton
 Electric conductor, telephone, telegraph, or like wire. Overhead.....R. Hacking
 Electric meter.....W. H. Pratt
 Electric meter.....E. Thomson
 Electric meter anticreeping device.....C. D. Haskins
 Electric time switch.....M. R. Hutchison
 Electrical distribution system.....H. Edwards
 Electrical distribution system.....H. F. T. Erben et al
 Electrical distribution system.....2 pats.....C. P. Steinmetz
 Electrolytic cell.....A. E. Truesdell
 Elevator.....V. W. Mason, Jr
 End gate. Wagon.....C. Fisher
 Envelop.....M. Stormfels
 Envelop. Mailing.....M. J. Daly
 Excavating tooth for power shovels.....V. W. Mason, Jr
 Exercising device.....B. A. McFadden
 Explosive engine.....C. E. Inglis
 Fastening device.....W. J. Payne
 Faucet. Vinegar.....J. Ansley
 Feed water heater.....W. H. Brown
 Feed water regulator.....R. J. Fliin et al
 Feeder. Boiler.....I. S. Davis
 Fence.....E. D. Carr
 Ferrule cover. Trap.....O. G. Hitchcock
 Fertilizer and the product resulting therefrom. Converting salt marsh material, &c., into a.....J. J. Croke
 Fibrous materials. Machine for balling or winding silvers of.....W. B. Lee
 File. Card index.....reissue.....C. W. Scarritt
 File. Letter.....F. Trambly
 File. Loose leaf.....L. G. Schult
 Firearm magazine.....A. D. Marble
 Firearm safety catch.....C. P. Pay et al
 Fire doors. Apparatus for automatically operating.....C. R. Bumbarger
 Fire escape tilting extension.....M. Cody
 Fire extinguisher systems. Valve for.....F. Gray
 Fish hook.....F. J. Baker
 Floors, &c. Construction of.....F. L. Ellingwood
 Foot cleaner.....W. S. White
 Fuel blocks. Manufacturing artificial.....A. D. de Micheroux
 Fumigator.....T. H. McDonald
 Funnel. Filtering.....S. Rudner
 Furnace.....W. H. Drake
 Gage.....S. R. Dummer, Jr
 Game.....A. F. Knight
 Game apparatus.....R. J. Graham
 Game apparatus.....C. W. Wagner
 Game apparatus.....A. Voeg
 Game apparatus.....A. S. Alexander
 Game board.....H. Cooper
 Garbage can.....W. S. Young
 Garment support.....H. Braley
 Garments or the like. Strap connection for.....M. Dattlebaum
 Gas apparatus. Acetylene.....2 pats.....E. Bournonville
 Gas lighting device.....A. Simonini
 Gas motor.....L. A. C. Letombe
 Gear. Regulating.....W. A. P. Werner
 Gear wheel.....V. W. Mason, Jr
 Gearing. Change speed.....O. M. Carman
 Glass articles. Apparatus for the manufacture of hollow.....reissue.....W. Buttler
 Globe holder.....E. L. Wheeler
 Golf ball.....2 pats.....F. H. Richards
 Golf club.....B. A. Joulé
 Grab hook.....J. Perdue
 Grapple. Supporting.....A. T. Dudley
 Gravity feed lubricator. Automatic.....T. R. Brown
 Greenhouse.....C. Ickes
 Gun rack.....H. N. Whitcomb
 Hammer. Pneumatic.....C. H. Shaw
 Hammock.....I. E. Palmer
 Handle for bags, satchels, &c.....W. Roemer
 Harmonica. Mouth.....H. Hoehner
 Harness.....J. Drum et al
 Harrow.....W. J. Doyle
 Harrow.....J. J. Furthmiller
 Harrow tooth bar.....T. R. Wallis
 Harvester.....J. J. Kennedy
 Harvester.....J. W. Pridmore et al
 Harvester attachment. Corn.....M. F. Hughes
 Harvester. Corn.....H. H. Bowerman
 Harvester grain carrier.....W. Foster
 Harvesting machine. Beet.....F. M. Oeder
 Hat felting machine.....J. S. Taylor
 Hay press.....T. Shank
 Headlight for street cars, &c. Adjustable.....G. F. Chapman
 Headlight operating mechanism.....G. F. Chapman
 Hen protector.....J. F. Siems
 Hinge.....F. F. Tryon
 Hinge. Box.....D. L. Hill
 Horse checking apparatus.....R. Forrest
 Horseshoe.....B. F. Gosrell, Jr
 Horseshoe's box.....J. B. Fladby
 Hose patch.....J. M. Thomas et al
 Hub. Ball bearing.....T. R. Garnier
 Hub. Pivoted.....J. H. Genter
 Human treatment apparatus.....I. J. Hartford
 Hydrocarbon burner.....F. L. Carter
 Hydrocarbon burner.....C. R. Kittle et al
 Hydrocarbon incandescent burner. Liquid.....A. Albrecht
 Incandescent burner head.....T. Gordon
 Index rod lock. Card.....E. W. Woodruff
 Insulated rail joint.....2 pats.....G. L. Hall
 Insulator.....J. L. Shreffler
 Inventory and appraisal blank.....F. Shock
 Jar and cover.....S. J. Raymond
 Jar holder. Safety.....W. W. Blossom
 Jar or bottle press.....J. J. Haley
 Joint for pipes, fittings, or other connections.....M. Dean
 Journal bearing.....W. G. Vernon
 Knife and fork support and knife sharpener. Combined.....G. C. Worthington
 Knob to spindles. Attaching door.....A. B. Vanes
 Ladder. Step.....S. S. Adkins
 Ladle. Stopper.....J. H. Allendorfer
 Lamp.....M. M. Johnson
 Lamp. Carriage.....I. H. Atwood
 Lamp. Incandescent vapor.....A. J. Simpson, Jr
 Lamp socket. Electric.....H. T. Paiste
 Lantern pinion.....A. H. Neureuther
 Latch.....E. S. Cowan
 Latch. Adjustable gravity.....R. E. Miller
 Latch. Door or gate.....C. J. Moore
 Lathe.....O. G. Edmond
 Ledger. Loose leaf.....H. P. Gorman
 Lifting machine.....W. H. Jordan
 Lime. Apparatus for draining crystals of sulfate of.....C. S. Wheelwright
 Limekiln.....A. P. Broomell
 Liquid brake.....S. Diamant et al
 Liquors. Dispensing malt.....C. A. Bartliff
 Live rolls. Gear cover and frame for.....H. G. Dittbenner
 Lock.....C. Kuebler
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 Mechanical movement.....F. J. Donoughe
 Mechanical motor.....J. Cardiff
 Mechanical power.....D. R. Myers
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 Medicine holder. Magnetic.....L. G. Woolley
 Metallic tube without joints. Flexible.....C. Rudolph
 Metals. Compound for cleaning and soldering.....J. H. Young
 Metals. Hardening.....J. Deje
 Metals. Method of and apparatus for electro-deposition of.....C. J. Reed
 Microphone for high tension currents.....R. Gaillard et al
 Milk extracts. Making.....O. Eberhard
 Milk heater.....F. D. Talcott
 Milk jar protector.....F. S. Twombly
 Milker. Cow.....E. A. Nugent
 Mold.....E. Strauch
 Mop wringer.....H. Giberson
 Nailing machine.....J. W. Reed
 Needle making machine.....E. Fontaine
 Nest. Trap.....W. P. Willett
 Nipple. Nursing bottle.....C. A. Tatam
 Numbering or marking machine.....A. B. Neill
 Odor distributing apparatus.....C. T. Bradshaw
 Ordnance sight.....L. K. Scott
 Oven illuminating device. Baker's.....Barenz
 Packing case.....C. L. Shelton
 Padlock. Permutation.....A. Nadeau
 Paper box making machine.....H. Iuman
 Paper making machine.....T. A. Boyne
 Paper making machines. Wire guide for.....J. A. White
 Pen. Reservoir.....R. T. Gillespie
 Penholder. Fountain.....G. W. Mabie
 Phenylglycin. Making.....W. Hentschel
 Photographic bath apparatus.....C. S. L. Kennedy
 Photographic detector device for passenger cars. Automatic.....F. W. Brooks
 Photographic plates. Reducer for overexposed.....H. G. Krieger
 Photographic purposes. Lens system for.....E. Lohmann
 Photometer.....E. T. Turney
 Photometer.....C. P. Matthews
 Picture exhibiting and taking machine.....W. N. Selig
 Pin.....A. A. Mannings
 Pin keeper.....C. G. Pingel
 Pin retainer.....C. N. Brown
 Pipe sections. Means for punching rivet holes in sheet metal.....G. M. Livingstone
 Placket fastener. Skirt.....J. P. Famous
 Planter. Corn.....F. F. Smith
 Planter. Corn.....E. M. Heylman
 Planter. Seed.....F. Berlin
 Plastic materials. Press for making building or paving blocks from.....J. A. Joyce
 Plate straightening machine.....C. L. Huston
 Playing ball.....2 pats.....E. Kempshall
 Playing ball.....4 pats.....F. H. Richards
 Plow foot and scraper. Combined.....C. G. Darnell
 Plow or cultivator handle.....J. G. Johnson
 Plow wheel adjusting device.....A. O. Artman
 Plows. Combined stop and release mechanism for.....V. T. Gilchrist
 Pocket. Garment.....J. Moelter
 Poke. Animal.....G. Barnes
 Pole structure.....F. H. Lincoln
 Polyphase induction regulator.....2 pats.....C. P. Steinmetz
 Portfolio.....I. R. Jackson
 Potato masher.....J. D. Coney
 Power mechanism. Reciprocating.....A. R. Clarke
 Prepayment attachment.....E. A. Reeves
 Press.....C. H. Casper
 Press feeding mechanism.....W. R. Moyers
 Printing frame.....F. J. S. Gilbert
 Printing machine. Blue.....S. L. G. Knox et al
 Printing press.....G. S. Heath
 Printing press.....M. L. Severy
 Printing press feed gage.....E. L. Megill
 Propeller. Reversible.....M. H. Depue
 Propelling device for boats. Portable.....I. R. Miller
 Pump.....2 pats.....E. E. Hendrick
 Pump.....D. Lippy et al
 Pump attachment.....F. F. Semm
 Pump connection.....L. Rumboski
 Pump for measuring, mixing, blending, or diluting liquids.....R. G. Whitlock
 Pumping wells. Power device for.....J. J. Kwis
 Puzzle or toy.....G. W. Sheridan
 Rail expansion joint coupling. Track.....J. W. McBurney
 Rail.....E. Schlegel
 Rail joint.....J. Volzer, Jr
 Rail joint.....D. O. Brunner
 Railway crossing.....E. J. O'Neill
 Railway rail. Compound.....J. N. Crabb
 Railway signal.....G. L. Wilson
 Railway signal. Electric.....C. V. Richey
 Railway signal system. Electric.....2 pats.....E. P. Jessop
 Railway spike. Safety.....J. D. Betts et al
 Railway switch shifting mechanism.....E. W. Keyes
 Razor stropping device.....F. R. & O. Kampfe
 Razor stropping machine.....F. R. & O. Kampfe
 Reduction furnace.....H. E. Vosburgh
 Refractory stopper.....J. H. Allendorfer
 Respirator.....M. Jacobs et al
 Rivet strip.....J. S. Stokes
 Rock drill buffer device.....R. B. McConney
 Rock drills. Quick return spring for.....R. B. McConney
 Rock drilling and blasting apparatus. Submarine.....R. G. Packard
 Roof.....F. L. Kane
 Roofs. Laying.....F. L. Kane
 Rotary engine.....H. T. Dunn
 Rotary engine.....W. Z. Stuart
 Rotary engine.....T. P. Butler
 Rotary engine.....C. D. Janssen
 Rubber boot or shoe.....A. T. Schermerhorn
 Rugs. Machine for preparing strips of carpet for making.....H. Liebman
 Rule holder.....J. W. Keeley
 Sad iron.....J. Kalmar
 Sad iron.....W. Jones et al
 Safety hook.....A. M. J. Novella
 Sail hank.....J. M. Into
 Sanitary toilet sheet.....E. F. Lankenau
 Sash fastener.....J. A. Johnson
 Saw handle.....J. Chambers
 Saw setting machine.....C. Young
 Scale. Automatic weighing.....C. L. Bond
 Seal lock.....E. Tyden
 Seal lock.....G. B. Edgar
 Seal. Snap.....E. J. Brooks
 Seed drill.....A. McWhorter
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 Shaft driver.....H. E. Eberhardt
 Shaft hanger and bearing.....E. O. Lean
 Shears.....Z. L. Brewer
 Shearing machine. Gate.....C. A. Bertsch
 Shingle.....F. Randle
 Ship's course recording apparatus.....J. Hope
 Shoe.....A. T. E. Smith
 Shoe cleaning machine.....W. Richardson
 Shoveling board. Vehicle.....J. A. & J. G. Paxton
 Show case cover. Barrel or pail.....J. C. Thibault
 Sifter. Ash.....I. H. Taylor
 Silk. Artificial.....H. S. Mork et al
 Slide changing mechanism.....M. Berger
 Smelting furnace.....W. F. Hannes
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 Steam trap.....A. Silk et al
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 Suspenders.....L. & G. G. Stern et al
 Switch throw or stand.....C. E. Brown
 Switch throwing device.....A. Johnson
 Switch throwing mechanism. Electric or automatic.....J. M. Walker
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 Tag. Hat pin.....E. A. Reineman
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 Telegraphy.....2 pats.....A. C. Crehore
 Telephone attachment.....G. T. Newman
 Telephone exchanging circuits. Signaling and switchboard apparatus for.....D. S. Hulfish
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 Therapeutic bath.....A. Pfister-Schmidhauser
 Tide or other motor.....J. T. Copithorn
 Tie fastener.....E. F. Priddat
 Tie plate.....W. Goldie
 Tie plate machine.....F. W. Wood
 Tile. Baffling.....H. L. Van Zile
 Tiling.....C. Worth
 Tire fastener.....R. M. Connable
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 Tires. Machine for equipping vehicle wheels with rubber.....A. S. Krotz
 Toaster.....W. H. Silver et al
 Tobacco stemming and booking machine.....P. J. Hart
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 Trolley track. Overhead.....W. J. Sumner
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 Turbine. Reversible steam.....H. F. Tyack
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 Valve. Lock.....W. H. Baker
 Valve mechanism. Explosive engine.....G. J. Altham
 Valve. Reducing.....L. Schutte
 Valve. Steam engine cut off.....C. A. Marnder
 Vehicle engine. Motor.....C. R. Pfingling
 Vehicle. Motor.....A. E. Osborn
 Vehicle. Motor.....W. J. & G. Lane
 Vehicle running gear.....J. G. Hess
 Vehicles. Device for lessening the noise of vibration in.....H. G. Farr
 Vessel holding device.....G. E. Titcomb
 Vessel. Storing or shipping.....O. Anderson
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 Voting machine.....S. Loe
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 Washing machine.....C. Warren
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 Watchcase.....3 pats.....W. H. Fitz Gerald
 Watchcase. Reversible.....W. H. Fitz Gerald
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 Water closet.....G. E. Underhill
 Water closet coupling.....3 pats.....E. C. Smith et al
 Water closet. Ship's.....J. L. Mott, Jr
 Water closet ventilating attachment.....C. W. Schultz
 Water elevator. Compressed air.....W. McKee
 Weighing machine.....W. E. Rice
 Whiffletree hook.....C. A. Clark et al
 Whistle. Steam.....I. Anderson
 Windmill.....J. Aeschlimann
 Windmill.....W. Faubion
 Window frame.....F. G. Oldenburg
 Wire fabric for belts or aprons.....C. Swinscoe
 Woodworking tool.....V. E. Wygant
 Wrench.....A. E. Chevrax
 Wrench.....J. F. Barrett

DESIGNS.

Basin. Wash.....P. J. Madden
 Carpet.....L. H. Brown
 Carpet.....F. A. Haas

Carpet.....W. A. Perry
Drinking vessel....2 pats.....L. Bessiere
Lamp body.....A. L. Baron
Mirrors, brushes, &c. Back for hand.....
.....Z. Freund
Reflector for artificial light.....E. L. Elliott
Spoons, &c. Handle for.....J. E. Straker, Jr

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Foreign patents may also be obtained in certain other countries.

The Materialization of Jules Verne's Dreams.

While M. Jules Verne's heroes were discussing miracles in the saloon of the "Nautilus," many fathoms beneath the surface of the troubled sea, a man of flesh and blood in Dublin was wrestling with the ancient problem of submarine navigation. With what measure of success he met we well know, but so rapid has been the progress of science, in the thirty-five years since the days of the "Nautilus," that we wondered more at her voyage through the pages of a book than we did, the other day, when a real "Nautilus," of iron and steel, lay submerged for many hours on the bottom of Peconic Bay. Through the dark hours of a stormy night, when schooners were tossed on shore by the waves, the submarine destroyer "Fulton" rested so quietly that none of her crew suspected there was a ripple overhead. And when, after the vessel rose to the surface, an admiral of the navy stuck his head out of the conning tower, he said: "Let's go below again, for it's wet and cold up here, and it's snug and warm down in the 'Fulton.'"

How closely the "Fulton" resembles the "Nautilus,"—both cigar-shaped vessels of steel, with windowed conning towers amidships, and propelled by electrically-driven screws! Jules Verne wrote in the infancy of electricity, but in his fancy he builded electric motors and incandescent lamps. The fairyland "luminous globes," in which the light was produced "in vacuo," are now more familiar to us than oil lamps. The storage battery of the "Fulton" was not dreamed of in the days of the "Nautilus," and the novelist had to leave the source of the electricity a half-revealed secret of the resourceful Captain Nemo. But was not our modern electric motor clearly foreseen in the "Nautilus's" engine, turned by "electro-magnets of great size?" Captain Nemo astounded M. Aronnax by telling him that he kept the boat warm and even cooked his food by electricity. But this is no novelty now, to the American who rides home in an electrically driven, heated, and lighted street car, and eats a supper cooked over an electric stove.

There were awful days on the "Nautilus" when, imprisoned beneath the antarctic ice, her supply of fresh air became exhausted. On the sixth day, when hope had all but fled, the ice was broken, and the air-starved crew breathed again. The "Fulton," however, is a more wonderful creation; for, with her compressed-air cylinders, she can keep the air within the shell fresh for many days. As in the dream of the novelist, the real submarine boat is sunk by filling compartments with water. For the use we have for submarine boats,—offensive operations in naval warfare,—deep-sea running is not desirable, and the "Fulton" would be crushed to atoms under the enormous pressure of the low levels to which the "Nautilus" was sunk. But, should human needs demand a deep-level cruiser, American inventive genius would undoubtedly solve the problem.—*Success.*

Inventor's Claim Sustained.

Judge Buffington of the United States Circuit Court September 15, handed down the decision in the suit of John Brislin and Antonio Vinnac against the Carnegie Steel Company, limited, now a part of the United States Steel Corporation. The plaintiffs sued for infringement of a patent. Their device is a feeding mechanism for rolling mills, and the plan of a table moving both laterally and vertically, which they invented, is in use in every structural mill in the country. They filed a bill in equity in the United States Circuit Court against the Carnegie Company in May, 1897, charging an infringement of first and second claims of the patent granted to them on July 20, 1886, and several claims of a patent granted to Patrick Hanley and Francis M. Ritchey on November 16, 1886, and assigned to Brislin and Vinnac. The defense of the Carnegie Company was invalidity of the patent and non-infringement. The case was argued for several days before Judge Buffington last spring, and his opinion went on file sustaining the patent.

In opening his opinion Judge Buffington says the case is important, as it frees from, or subjects to patent monopoly the mechanical rolling of steel beams used in modern building. He then goes into the question of rolling iron, describing the advance from manual to mechanical rolling that has made possible the manufactures of today. In view of this great advance, the Court holds that it would seem just that those who have, from an inventive standpoint, substantially brought about such advance, should share proportionally in the gains thereof.

After discussing earlier patents of somewhat similar character the court says:

"In the Brislin-Vinnac device we find for the first time in heavy rolling—and if such a thing existed in lighter forms of rolling it has not been deemed sufficiently relevant to be called to our attention—the combination of a pivoted table, adapted to feed metal at both the upper and lower passes of more than one stand of such rolls. Throughout the mass of proofs in this record, the testimony of experts familiar with the practice of the art in this country and abroad, this one fact stands out in bold relief, unquestioned: No one prior to Brislin and Vinnac thought of, much less embodied in form, the coupling to a pivoted table and a movable carriage.

Conceding that all the elements of Brislin and Vinnac invention were in themselves old, yet it must be conceded that they were the first to take the separate, undivided elements of advance in the rolling art and so combine them as to accomplish continuous, complete mechanical heavy rolling and make possible a new product, to wit., a machine rolled heavy beam. The separate steps of Fritz, of Slade, of Lewis, of Wellman, securing lateral, vertical movement and tilting movements, were each deemed worthy of patent protection and reward. Why, then, should the step of Brislin and Vinnac, which carried this advance to the culmination in combining lateral and vertical in such a way that both movements could

be used in each form of roll to which prior inventors had succeeded in applying but one of such movements, be deemed not only worthy of patent protection, but of such favorable regard as the broad important field it pertained to, would warrant? A device which transfers from the field of human toil to mechanical work the handling of huge masses of iron heated to a point almost prohibited to human handling is a beneficent factor that is not to be measured by the economies of a mere labor saving machine. While the motive and reward of the inventor is a monetary one, his work, measured by beneficent results, may rise to the dignity of the humane. At all events, in this case it fulfilled the statutory requirements of being useful and novel."

The Court sustains the charge of the first claim of the Brislin & Vinnac patent, which covers the vertical and lateral movement of the table. The second claim, which calls for combination of carriages on each side of the rolls, and embodies devices for simultaneously inclining the roller frames of the two, dismissed with the assertion that the Carnegie Company has no such device. The Hanley & Ritchey patent is not sustained, being regarded as a mere engineering problem. A decree was ordered to be drawn in accord with the views expressed in the opinion.

Effect of Prior Publication.

It is said that the English patents of the Bell telephone, which are of great financial value, were obtained through a slight accident, which, however, was of enough importance to change the whole course of telephone development in England. When the telephone was being introduced in this country Lord Kelvin was here and was so much pleased with its operation that he took one to England to exhibit before his classes. When it was attempted to produce sound through it the instrument failed to work, and it was later found that the trouble was due to the displacement of a small spring, which occurred during its transportation. Before Lord Kelvin succeeded in remedying this the English patents were obtained; but according to English law if he had discovered the disarrangement and rectified it so that the telephone would have been in use before the date of issue of the patents, Mr. Bell would have been compelled to forfeit his right to the patents.—*Age of Steel.*

Engineering and Machinery Exhibition at London.

The State Department has received from Consul-General H. Clay Evans, of London, notice of the exhibition of engineering, machinery, hardware, and allied trades to be held at the Crystal Palace, from March 2 to May 31, 1903. In a communication from the manager of the exhibition, which is transmitted, it is asked that the attention of American manufacturers be called to this opportunity to introduce their goods and to strengthen their connection with the various markets of the world.

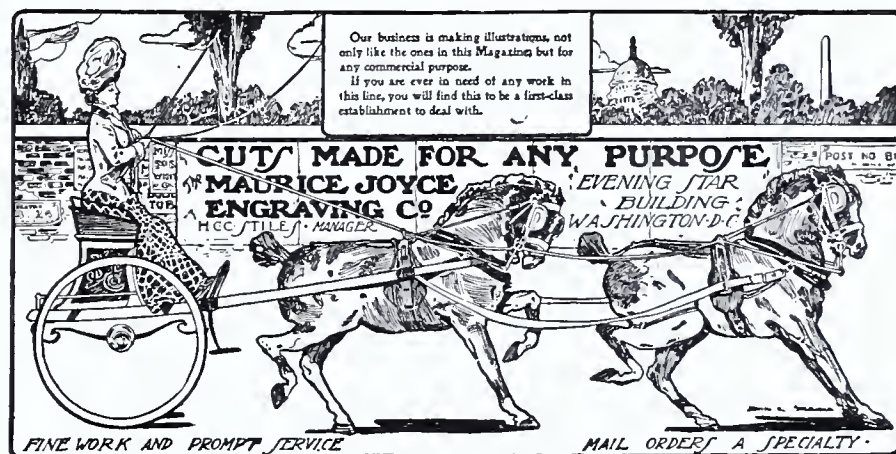
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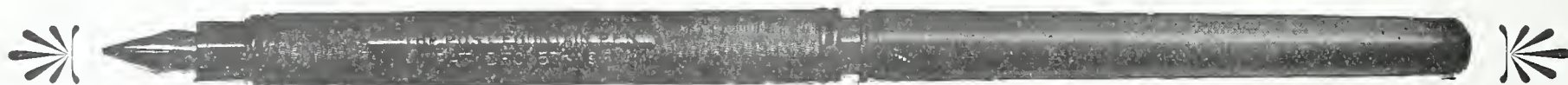
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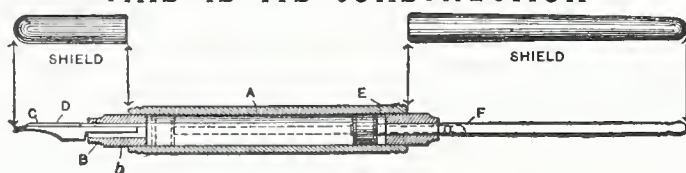


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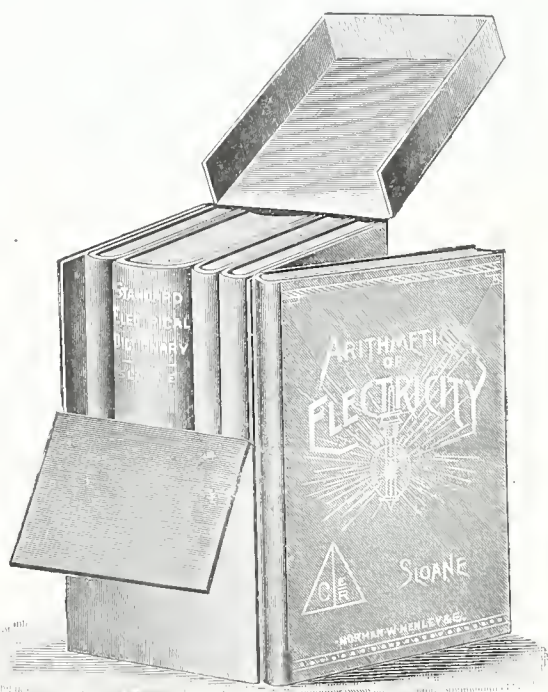
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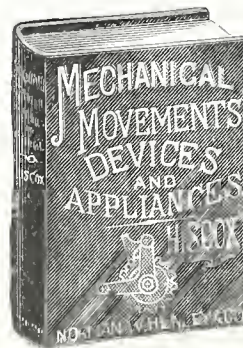
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= = A Wonderful Bridge. = =

WHEN the Southern Pacific determined, upon the recommendation of its general manager, Julius Kruttschnitt, to build the steel bridge over the canyon of the Rio Pecos in Western Texas, it was for the joint purpose of reducing the mileage of the line, and to remove the possible danger which was contained in the fact that it was necessary for the trains to make use of a tunnel where the track followed the Rio Grande to the point of entry of the Pecos.

The full moment of the undertaking was realized by the skilled engineer who had conceived and planned the gigantic enterprise; but the science of modern engineering had so far advanced that operations; which ten years before would have been impossible, became comparatively easy of conquest under the then existing conditions, provided always the engineer was not at fault and the material could be secured.

There was no hesitancy in the work of constructing the great Pecos viaduct, when the project had been finally determined upon. This followed a careful survey and investigation of the "cut-off" route, which was made in 1890 under the direction of General Manager Kruttschnitt, and the contour projected and marked. The contract for the massive stone piers upon which the steel structure rests, was awarded to Ricker, Lee & Co., of Galveston, during the latter part of 1890, and active work was commenced in March of the year following. This feature of the construction was completed in November of that year. The piers were built upon a solid ledge of rock, the two supporting the cantilever shore arms having a coping of Syenite granite from Burnet County, Texas, from the quarries which produced the stone used in the State capitol. The

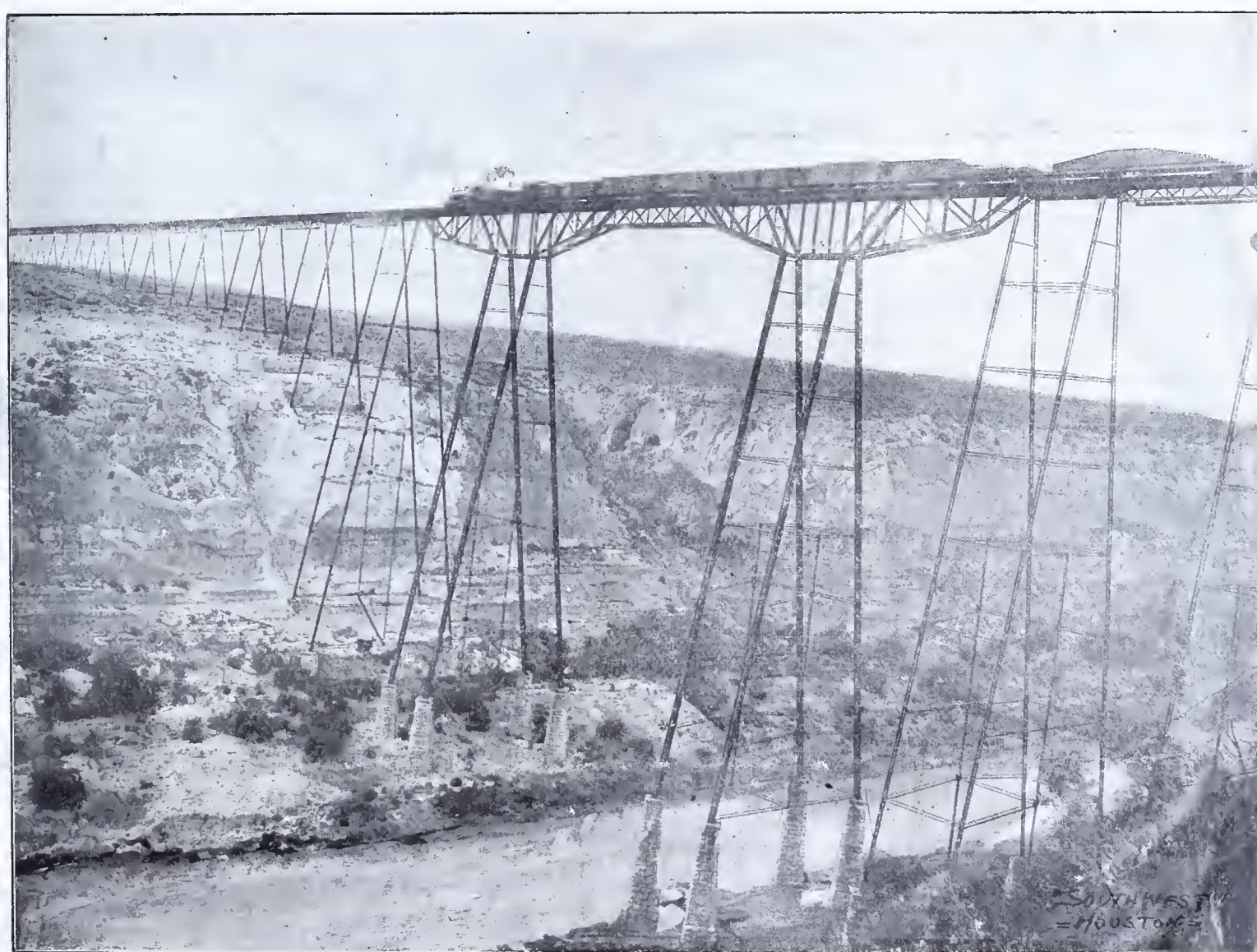
mason work contained 3,269 cubic yards of stone work, costing, including the clearing and excavating, \$85,253. The total cost of the work was as follows:

Foundation, masonry and excavating.....	\$85,253 87
3,640 pounds iron and steel.....	174,727 42
Floor, guard rails and fireproofing.....	5,371 14
Total.....	\$265,352 43

The viaduct is 2180 feet long, and the central span is 321 feet above the water level of the Pecos river. It is the third highest bridge in the world, it being exceeded only by the Garabit viaduct, which spans a gorge 402 feet deep in France, and the Loa viaduct of the Antafogasta Railroad, Bolivia, S. A., which crosses a ravine in the mountains 336 feet deep. The structural

strength of the Pecos, however, far exceeds the bridges mentioned the live load weight of the Pecos bridge being 5000 pounds per lineal foot, as against 3220 feet for the Garabit and 2800 for the Loa. It will thus be noted that the Texas bridge is easily one of the most wonderful and unique in the world.

The relatively with residue, giving work we daily produce on earth. It is on the inorganic and composition. The engine has been granted a dressing company, which the employed. The head and on and saturated with sulphate. The cobrows out, in the be the surface which is collected. The material is used in It contains a potent aseptic property to cotton-weaving printers. The application of sodium sulphate as an agent in chroming and woolen goods is successful in producing factory progress. The recent address of sodium bisulphate as a substitute for acid for the white of the egg.



THE GREAT PECOS RIVER VIADUCT, ON LINE OF SOUTHERN PACIFIC RAILROAD.
(Courtesy of the Southern Industrial and Lumber Review.)

struction was the fire proofing of the ties and floor of timbers are of yellow pine, impregnated with creosote the rails, the wooden guard way, and walk, being compounded iron. The viaduct is the center of an absolute signals, to provide against possible accident or collision. The work of construction from plans furnished, was by the Company. The resident engineer was B. M. Temple, bridge company being represented by the late J. T. M.

THE GREATEST FLYING CREATURE.

By PROF. S. P. LANGLEY,
Of the Smithsonian Institution.

A QUESTION of interest to all who are attracted to the subject of aerial navigation by flying machines (or things heavier than the air, and which, therefore, do not float like a balloon, but are dependent entirely on some mechanical power for their support) is, "what has nature herself done in the way of large flying machines, and are the birds which we see now the limit of her ability to construct them?"

In the former epochs of our planet's history, there were larger flying crea-

tures than now, notably the Pterodactyl, "a brother to dragons," a reptile rather than a bird, but a reptile with enormously great wings. We do not know just how great this was in the living creature, except for we have only the skeleton (which is all we have of the Pterodactyl, a featherless and in that important respect from a bird) will be the expense that of the

classes. Its weight is not to be exactly estimated, but from a variety of considerations, it is possible that the average specimen of Ornithostoma, in spite of its great wing space, did not weigh over thirty pounds. Now we wish for our especial purpose of comparing this bird with other flying things, to know (a) the supporting area in square feet, (b) the weight, and (c) the power, for (1) a flying machine of man's invention, which has actually flown for comparatively long distances, (2) like facts for this

paleontologist says that approximately the wing surface was 25 square feet, the weight something like 30 pounds, and I infer from the consideration just quoted, that the power was probably less, than 0.05 horsepower: the immensely greater economy and efficiency of nature in the respect of power being most strikingly shown when compared with that in the flying machine of man's invention.

After this comes the condor, pre-eminently a soarer. Its stretch of wing is 9 to 10 feet, its supporting area very nearly 10 square feet, its weight 17 pounds, and the approximate horsepower it develops (inferred from the facts already stated) scarcely 0.05.

Next comes the turkey buzzard, whose stretch of wing is 6 feet, its sup-

porting area a little over 5 square feet, its weight 5 pounds, and the approximate horsepower it develops (as above) 0.015.

flapping its wings. This has an area of about 0.7 of 1 square foot, a weight of 1 pound, and a horsepower of 0.012. The last is the humming bird, whose area, when compared with the others, is almost too small to be distinguished, but which has a supporting surface of nearly 0.03 of a square foot, a weight less than 0.02 of a pound, and a horsepower of probably not over 0.001.

Particular attention is to be paid to the fact, that regarding the ratios of supporting surface to weight supported, these ratios are not only not the same in all the birds, but themselves differ greatly, yet systematically, with the absolute weight. If we inquire how much 1 horsepower would support, for instance, supposing the ratios of sustaining surface (i. e., wing area) to weight to be constant, we find that 1 horsepower would, in the flying machine, support 20 pounds with 36 square feet area of wing (i. e., $1\frac{1}{4}$ square feet to a pound); and that, passing to the flapping birds, if the wild goose were to preserve the same relations on an enlarged scale, its horsepower would support 346 pounds of weight with the use of 101 square feet of wing surface or 0.29 square feet to the pound; that in the pigeon 1 horsepower would support 83 pounds of weight with the use of 58 square feet of wing surface or 0.7 square feet to the pound, and that in the humming bird 1 horse power would support 15 pounds of weight with the use of 26 square feet of wing surface or 1.73 square feet to the pound. So that, broadly speaking, so far as these few examples go, the larger the creature, the less relative surface and power is needed for its support.

From the obvious mathematical law that the area in bodies in general increases as the square of their dimensions, while their weight increases as the cube, it is an apparently plain inference that the larger the creature or machine the less relative area of support may be (that is, if we consider the mathematical relationship, without reference to the question whether this diminished support is

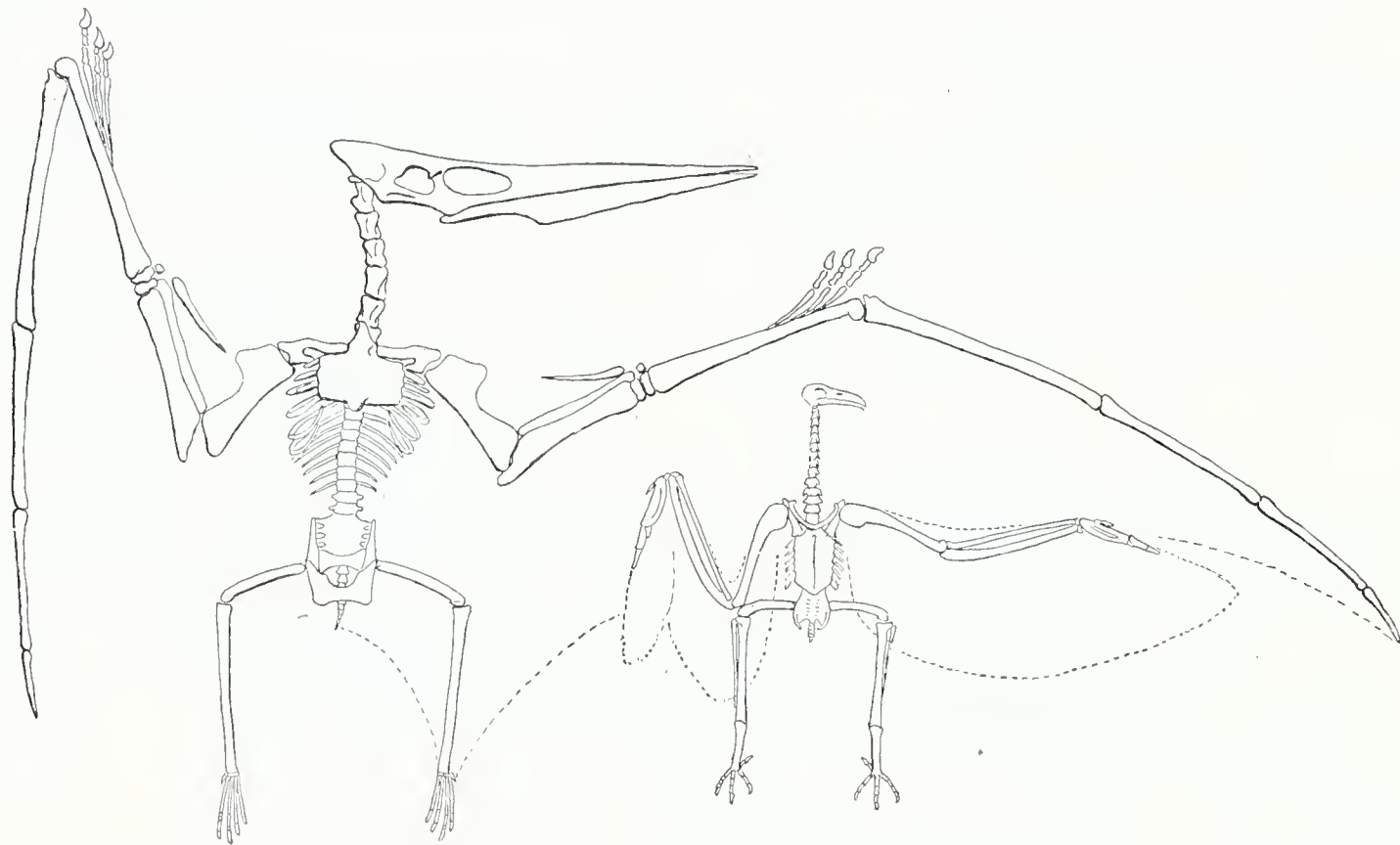


Plate I. SKELETON OF THE GREAT PTERODACTYL ORNITHOSTOMA COMPARED WITH THAT OF THE CONDOR.

tures than now, notably the Pterodactyl, "a brother to dragons," a reptile rather than a bird, but a reptile with enormously great wings.

We do not know just how great this was in the living creature, except for we have only the skeleton (which is all we have of the Pterodactyl, a featherless and in that important respect from a bird) will be the expense that of the

Lib take the expanse of the of a bird, as giving us wing of the actual bird, it greatly underestimate it, the skeleton being much \$5 skeleton (which is all we have of the Pterodactyl, a featherless and in that important respect from a bird) will be the expense that of the

in the illustration the to than ordinary specimen, a Pterodactyl book, indicates a spread of ty feet. It is com-

the condor, nearly the same as the Pterodactyl, a featherless and in that important respect from a bird) will be the expense that of the

the condor, nearly the same as the Pterodactyl, a featherless and in that important respect from a bird) will be the expense that of the

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the condor, nearly the same as the Pterodactyl, a featherless and in that important respect from a bird) will be the expense that of the

the largest of nature's flying machines, and (3) for some of our present birds. To recapitulate, we need for our special purpose at least the following data for any flying thing, namely, (1) the supporting area in square feet, (2) the weight in pounds, and (3) the horsepower which drives it through the air.

It is evidently impossible to exactly recover all of these for the Pterodactyl, and hard to definitely establish all three even in living specimens, but we may assume in the case of the horsepower, that it is proportioned to the area of the attachment of the muscles which moved the bird in flight, an assumption which is doubtless only approximately true, but may serve our immediate purpose. With this understanding, I present an instantaneous photograph of a steel flying machine in actual flight (Pl. II), and shall compare the same with various flying creatures.

This steel flying machine shown in the photograph had a supporting area of 54 square feet, a weight of 30 pounds, developed $1\frac{1}{2}$ horsepower, and repeatedly flew from one-half a mile to three-quarters of a mile. Immediately after it, comes nature's greatest flying machine, the Pterodactyl. This may have been quite 20 feet from tip to tip of wing. The

porting area a little over 5 square feet, its weight 5 pounds, and the approximate horsepower it develops (as above) 0.015.

All the above are soaring birds. I now pass to another order of birds, which flap their wings. The wild goose, with a supporting area of 2.7

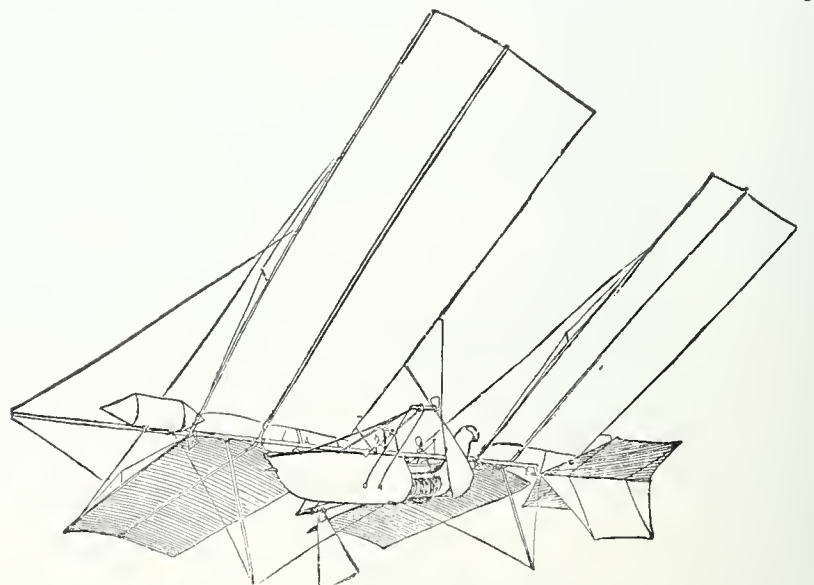


DIAGRAM OF THE LANGLEY AERODROME.

square feet, has a weight of 9 pounds, and needs a proportionately greater power of nearly 0.026 horsepower to drive it, as against scarcely 0.02 horse power in the last example.

Next we have another familiar bird, the pigeon, which drives itself by

actually physically sufficient or not), so that we soon reach a condition where we can not imagine flight possible. Thus, if in a soaring bird which we may suppose to weigh 2 pounds, we should find that it had 2 square feet of surface, or a ratio of a foot to a

pound, it would follow from the law just stated that in a soaring bird of twice the dimension, we should have a weight of 16 pounds and an area of 8 square feet, or only half a square foot of supporting area to the pound of weight, so that if flight is possible in the first case it would appear to be highly improbable in the second. The difficulty grows greater as we increase the size for when we have a creature of three times the dimensions we shall have twenty-seven times the weight and only nine times the sustaining surface, which is but one-third

not be supported, and while the fact is certain that it can, the cause of this does not seem to be clearly known.

Special cases, it may be said, may furnish an exception to what in the nature of things must be the general rule. Such, however, again does not seem to be the fact. This anomaly, which is even now not generally appreciated, seems to have been first noticed by a French observer, M. de Lucy, who about 1868 published a memoir, which I have not seen in the original, but an English translation



PLATE II. LANGLEY'S AERODROME IN FLIGHT.

of a foot to a pound. This is a consequence of a mathematical law, from which it would appear to follow that we can not have a flying creature much greater than a limit of area like the condor, unless endowed with extraordinary strength of wing.

But this apparently necessary mathematical consequence is not the law of nature, for while it is found that in the larger bird a smaller area for each pound of the weight is given under the law than in the smaller bird, it is also found (what is another thing) that this smaller area is nevertheless sufficient, and that from the mathematical law just cited, there does not follow the apparently obvious consequence (notably in the larger creatures like the condor, perhaps less notably in such a creature as the Pterodactyl), that the bird can

of which was published in the Fourth Annual Report of the Aeronautical Society of Great Britain for 1869. The same facts are given at greater length in an article by Dr. Karl Mullenhoff, of Berlin, in the *Archiv für die Gesamte Physiologie*, Volume XXXV.

The P. R. R. Not to Build Engines.

The Pennsylvania Railroad has changed its plan for building its locomotives next year. The Baldwin Locomotive Works has received what is probably the largest order for engines ever given to a single concern by a railroad company. The order is for 250 high-class freight locomotives, the total cost of which will be about \$3,250,000. All these engines are to be delivered within the first six months of 1903.—*The Iron Age*.

THE UTILIZATION OF WASTES AND BY-PRODUCTS IN MANUFACTURES.

WITH SPECIAL REFERENCE TO THE DECADE OF 1890-1900.

By HENRY G. KITTREDGE, of the Census Bureau.

PART IV.

PAPER MANUFACTURE.

In the utilization of waste products there is a close relation between the manufacture of paper and that branch of the lumber and timber industry which reduces wood to fibrous pulp. In fact, paper has always been made chiefly by the utilization of waste materials obtained from the vegetable world, such as rags, old rope, straw, etc. But there was a smaller quantity of cotton rags and other cotton substances used in 1900 than 1890, and a very much smaller quantity of such substances as manila stock, rope waste, etc. On the other hand, there was an increased use in 1900 over 1890 of such materials as straw, old waste paper, and particularly of wood pulp made either by a mechanical or a chemical process.

The best variety of fiber obtained from wood is that produced by chemical means, which renders the wood free from the resinous matter found in wood prepared by grinding. If resin is left in the fiber, it resists strongly the action of the bleaching agents, causing the paper to become yellow after a time. There are two processes chiefly in use for the chemical preparation of the wood fiber—the caustic soda and the bisulphite processes—the latter being much more widely employed than the former. There is another process, known as the Franke process, which uses bisulphite of lime. The efficacy of the bisulphite process is explained by Cross and Bevan, to the effect that the chief agency is the hydrolytic action of sulphurous acid, aided by conditions of high temperature and pressure. This process yields a large amount of pure fiber, preserving its original strength, which is not the case when the caustic soda process is used. German chemists have found that an organic substance containing sulphur can be obtained from waste sulphite liquor in different ways, and the product has been proved to be similar by a corresponding amount of sulphur contained therein.

From a sanitary, as well as industrial point of view, the recovery of the sulphite liquor as a waste from wood-cellulose factories is worth the attention and ingenuity of inventors. A prize of 10,000 marks was offered in Germany in 1894 for the best and most successful method of treating waste sulphite liquors so as to prevent the pollution of the streams into which these liquors ran.

There has yet been evolved no satisfactory application of the waste liquors from the bisulphite process. Evaporation and combustion involve large losses of sulphur. A more complete regeneration of the sulphur has been the subject of a series of German patents, but the processes are inefficient through neglect of the actual state of combination of the sulphur, viz, as an organic sulphonate. The process of V. B. Drewson consists in heating with lime under pressure, yielding calcium monosulphite (with sulphate and lignone complex in insoluble form). The sulphite is redissolved as bisulphite by treatment with sulphurous acid. This process, however, is relatively costly and yields necessarily an impure lye. It has been proposed to employ the product as a food stuff both in its original form and in the form of benzoate; but its unsuitability is obvious from its composition. A method of destructive distillation has been patented in Germany, but Prof. H. Seidel, of Germany, has investigated the process and finds that the

yield of useful products is much too low for its economical development. Fusion with alkaline hydrates for the production of oxalic acid is also excluded by the low yield of the product.

A number of German patents have been taken out for the recovery of the organic matter from waste sulphite liquor, and for the production of useful products therefrom. Many of these patents have for their object the extraction of a tannin material as size for paper. By this latter process the solution containing tannin (simply waste lye) is added to the pulp in a beating engine, and, when well mixed, a solution of gelatine is added, the result being an insoluble coating of tannin size upon the fibers. In a later patent the addition of resin size is recommended. According to a German patent of 1891, a means of osmosis is proposed for obtaining a purer form of tannin suitable for tanning hides.

In the opinion of Prof. H. Seidel, the application of the waste liquors from the bisulphite process to tanning purposes, appears promising from the fact that 28 per cent of the dry residue is removed by digestion with hide powder. This application, however, he says, has been extensively investigated, but without practical success. Various uses are suggested by the viscosity of the evaporated extract. As a substitute for glue in joinery work, in bookbinding, etc., it has proved of little value. It is applied to some extent as a binding material in the manufacture of briquettes, and also as a substitute for gelatine in the petroleum industry.

According to Dr. L. Gottstein, Breslau, Germany, the isolation from the waste waters of the bisulphite process of suitable tanning material for use in the leather factories has not been so successful as was at first expected; and the attempts to make alcohol, acetic acid, and oxalic acid have not given satisfactory results. He says, too, that all the attempts to produce usable material by the dry distillation of the solid residue from the liquor have also failed. The daily production in Germany of about 1,000 tons of sulphite pulp means about ten or twelve times that amount of liquor, having from 9 to 10 per cent solid residue, giving about 1,000 tons as the daily production of this substance. It is on the average about one-fifth inorganic and four-fifths organic in composition.

A German patent has been granted for the production of a dressing compound for textile material, which the inventor calls "Dextron." The liquor is neutralized, and then concentrated by means of evaporation and saturated with magnesium sulphate. The solution of this salt throws out, in the form of a scum upon the surface, the so-called dextron, which is collected, dried, and ground. The material, it is said, can be largely used in the place of dextron. It contains tannin and possesses antiseptic properties, and is sold chiefly to cotton-weaving mills and calico printers.

Prof. H. Seidel's application of soda salt from the lignone sulphonic acid as a reducing agent in chrome mordanting wool and woolen goods is claimed to be successful in practice, and its industrial development shows, it is said, satisfactory progress. The product is known as ligno-rosin. Dr. Gottstein, in a recent address, observes that sodium lignin-sulphonic acid (ligno-rosin) as a substitute for tartaric or lactic acid for mordanting wool plays, in proportion to the great amount of sulphite liquor produced, a

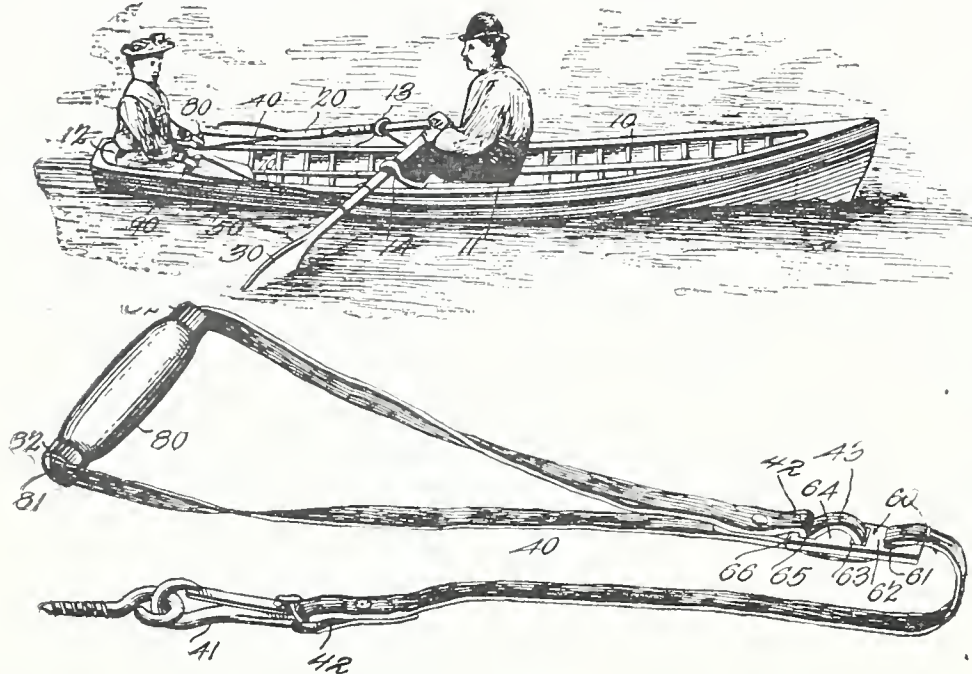
Continued on page 5.

CLEVER NEW PATENTS.

Oar Attachment.—Computing Machine.—Door Knob and Bell.
A New Automatic Air Brake.

Oar Attachment.

Mr. Mons A. Linder, of Pullman, Illinois, has patented an oar attachment, whereby two persons may row with a single pair of oars, or a single oarsman may transmit auxiliary force by using his feet and legs. The oars are of the usual shape, and the shanks of the oars, outside the locks, are provided with eyes. Extensible draft straps are connected to these eyes by means of snap hooks, their free ends being provided with handles. Thus, a person sitting in

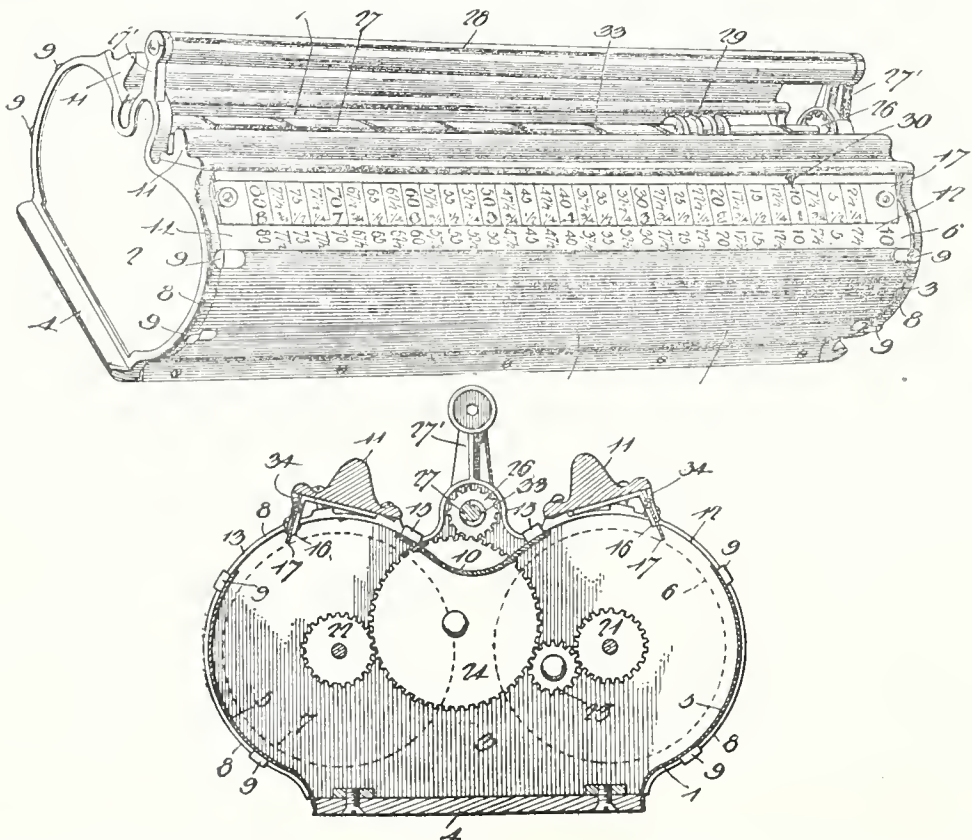


one of the rear seats or the stern of the boat, by drawing upon the straps as the stroke is made by the oarsman, will assist materially in the propulsion of the boat. Or, the oarsman himself may place his feet against the handles which constitute stirrups, and by using his legs can obtain additional power. The inventor claims that by the use of his invention, which may be applied to any row boat without altering the structure, fully thirty per cent is gained in speed over the old method of using the arms only.

Computing Machine.

Many of the so-called computing machines invented have been so complicated in operation that they are useless to the average business man, who prefers to depend on brain-work rather than spend time and patience in manipulating complicated machinery. These remarks, however, will not apply to the machine recently patented by Mr. Edmund Roenius, of Grand Rapids, Wisconsin, views of which are herewith presented.

The invention improves the construction of computing machines and provides a simple and comparatively inexpensive one of increased capacity designed for computing wages, interest, etc., and adapted to be readily operated to indicate the wages due at a given rate for a given length of time or an analogous result, whereby all mental calculation in ascertaining such results will be obviated.



1 designates a casing composed of ends 2 and 3, a bottom 4, and opposite sides 5, which are curved and bowed outward to conform to the configuration of rolls 6 and 7, which are mounted within the casing. The ends of the casing are provided with curved side edges to conform to the configuration of the sides 5, and they have curved flanges 8, receiving and supporting the sides. The casing is also provided with a top composed of a central section 10, and side bars or sections 11, spaced from the upper edges of the curved sides 5 to form longitudinal apertures 12 and 13, for exposing portions of a result-sheet arranged on the rolls 6 and 7, and designed to be provided on both its faces with numerals or other characters for indicating the various results desired. The said

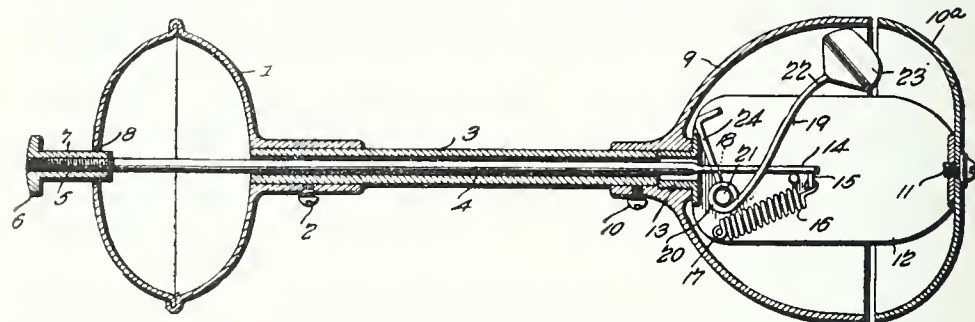
result-sheet is so arranged on the rolls that one of its faces is exposed at one of the sight apertures or openings and its other face is exposed at the other aperture or opening. The central section 10 of the top is curved, as shown, presenting a concave upper face and provided at its ends with tongues 15 for engaging the upper edges of the ends. The side sections or bars 11, are designed to be in the form of ornamental molding and are provided with depending arms 16, for supporting a rate-bar 17. The rate-bars, which are preferably constructed of sheet metal, have their lower edges arranged adjacent to the surfaces of the result-sheet, and the rate-scale preferably consists of a strip of paper having printed numerals or other characters for indicating the various rates of wages, interest, or the like.

The rolls consist of hollow cylinders provided at their ends with journals arranged in suitable bearing-openings of the ends 2 and 3, of the casing 1, and they are connected rigidly with pinions 21 and 22, which may be keyed to the adjacent journals of the rolls. The pinion 21, meshes with an intermediate pinion 23, which meshes with a gear-wheel 24, and the other pinion 22, meshes directly with the gear-wheel 24. By this arrangement of gears, the rolls are caused to rotate in the same direction, so that the result-sheet will be unreel from one of the rolls and wound upon the other roll when the gearing is actuated. The result-sheet extends downward and inward from the top of the roll 6, to the bottom of the roll 7, and one of its faces will be exposed at the sight-aperture 12, and its other face will be displayed at the sight-aperture 13. By this construction and arrangement, both faces of the result-sheet are displayed and the capacity of the machine is increased.

When it is desired to ascertain the amount due for a given length of time, the slide is first operated to carry the pointer to the number indicating the rate per day. This actuates the rolls and will bring the column corresponding to the position of the pointer opposite the opening, and the result may be readily ascertained by finding the number of the column opposite the character or number indicating the unit of time entering into the calculation.

Door Knob and Bell.

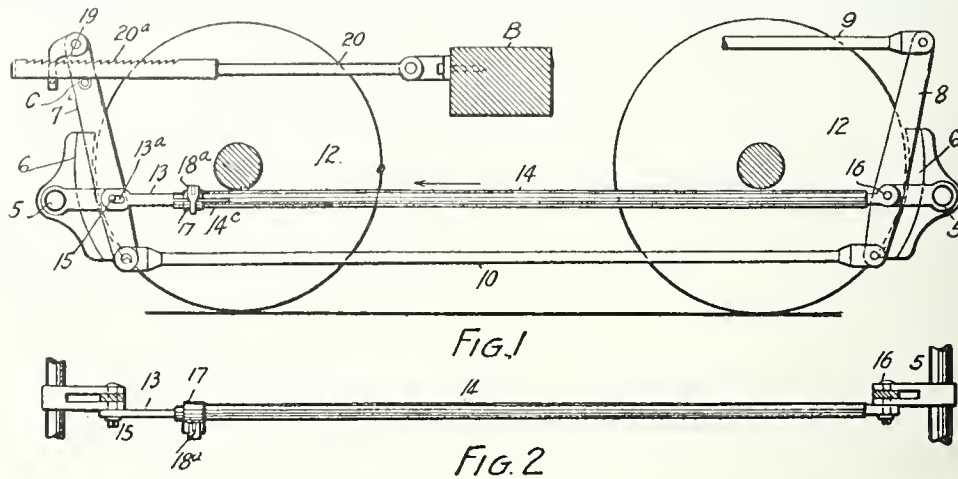
A combined door knob and bell has been devised by Mr. John W. Freeman, of Denver, Colorado, and a one-half interest in the patent obtained thereon has been assigned to Silas Haynes, of the same place. The object of this invention is to improve the construction of combined door knobs and bells, and to increase their strength, durability and efficiency, and to provide an exceedingly simple and inexpensive one, adapted to be readily operated by simply depressing a button located on the exterior of the outer knob. The invention mainly



comprises inner and outer hollow knobs connected by a tubular spindle. The inner knob is composed of two sections, one of which constitutes a bell. A bracket 12, is mounted within the knob, while a reciprocating rod 4, passes through the same and through the spindle and outer knob from which it projects, forming a push-button. A coiled spring 16, is connected with the rod and with the bracket, and is adapted to throw the latter outwardly. A pivot or stud is mounted on the bracket, and a resilient bell-crank lever 19, is provided at its angle with a coil arranged on the pivot or stud, this lever being provided on one arm with a hammer, and having its other arm connected with the rod, and arranged to be operated thereby. The combination door knob and bell is so constructed that it may be substituted for the ordinary door knob and placed on any door.

A New Automatic Air Brake.

Mr. William H. Sauvage, of Denver, Colorado, has obtained a patent on means for automatically adjusting the slack in car brakes so as to maintain the brake shoes at a uniform predetermined distance from the car wheels. Under the old system, it is customary, after trains are made up, to thoroughly test the air brakes on all cars before leaving the stations. This is usually done by the engineer making a full application of air. Inspection of the trainmen follows,



Continued from page 3.

very small role in its utilization.

Waste liquors from the sulphite boiling process contain in solution about 50 per cent of the weight of the dry wood. It is probable that, with the further development of the sulphite process, methods will be worked out by which this large amount of waste material may be utilized. The most obvious direction for such methods will be toward the preparation of glucose, alcohol, and oxalic and pyroligneous acids.

A process (patented) has been communicated by Mr. W. Trippe, of Esson-on-the-Rhur, Germany, relating to the treatment of waste liquors from the manufacture of sulphite cellulose. The lyes are inspissated in the usual manner by evaporation, though their inspissation is carried beyond the usual consistency of sirup, and is effected without the addition of any reagents calculated to promote the elimination of the solid compounds of sulphur. By the time the sirupy mass has been brought to contain only about 20 per cent of water, the sulphur compounds of the lye begin to decompose, yielding mainly sulphurous acid, and also, secondarily, some other volatile compounds of sulphur, such as mercaptanes, mercaptides, and the like. These gasiform products which, if desired, may be drawn off, may be utilized in a variety of ways, say in the manufacture of sulphurous acid, sulphuric acid, or compounds of such acids; or, if desired, in the production of sulphur and other sulphur compounds. The moment decomposition begins, a froth forms on the surface of the liquor, as a result of the first escape of gas, in the form of bubbles. The formation of froth discontinues after a resistant skin has developed on the surface. This is blown or distended, and hinders the rapid escape of the gases, thereby retarding the progress of the decomposition.

The physical effect—and also the chemical change—may be expedited by additions of organic substances capable of checking the formation of the resistant skin already mentioned. Among such substances may be mentioned the different varieties of pitch and similar tar products, resin, carbohydrates, hydrocarbons, glues, organic acids, and the ethers of such acids. These additions of organic matter are particularly effective when made in the form of solutions, the preferable solvents to be employed being benzine, petroleum, and other hydrocarbons or their derivatives. In order to expel the sulphur compounds, inspissation should be carried on to a point at which there shall remain behind a mass of paste, which while hot (or warm) is, indeed, plastic and kneadable, but which, when allowed to cool, becomes hard and brittle and can be broken up or pounded into fragments, like resin, for example. Inspissation may be carried on even beyond this point, until there remains a perfectly dry, sandy residue. It is a somewhat remarkable fact that this residue still retains the viscous or adhesive property, which it had been observed to possess in those forms in which alone it has been hitherto known to occur. The only form in which, until the present time, the mass was known to be adhesive was the liquor, sirupy form, either cold or warm, and the kneadable form which the mass assumes when cold.

The residue, if not evaporated right down to desiccation, forms, while yet warm, a moldable mass or paste, which, however, has lost none of its adhesive qualities; and this adhesiveness subsists both when the residue is moistened, as it would in the case of glue, and when it is heated, as in the case of resin or pitch, so that it may immediately be used as a substitute for any of these substances. The development of these qualities may be favored by superadding to the mass, while yet in the process of formation, such other substances as are capable of

increasing its adhesiveness; the nature of such additions, of course, depending upon the particular purpose which the adhesive mass is intended to serve. Among such substances, in addition to the organic compounds already referred to, as agents for the prevention of skin formation, are various albuminoids, albuminates, terpenes, resins, and tar products.

As a result of these additions, the residue will more closely resemble such adhesive substances as resin, pitch, or the like; but if the residue is readily soluble in water, the additions will be apt to diminish its adhesive property. Where the residue is treated with a view to its employment as a substitute for glue, resins, or the like, it is expedient to determine the degree of inspissation beforehand, with due regard to the qualities which the residue in its final form is desired to possess. Where, for example, it is to be used as a substitute for glue, inspissation should not be carried on as far as it would have to go if a substitute for resin were required.

As the residue has been freed from sulphur compounds, it is not only perfectly harmless to vegetation, but is fitted for use as manure, or as an addition to manure, by reason of the assimilable organic substances and of the lime in a finely divided state which it contains. Where, on general grounds or from local considerations, this treatment of the residue—which, economically speaking, is unobjectionable—is not deemed desirable, it may immediately be used as fuel; in which case the mineral ingredients of the lyes—in particular calcium or magnesium—should preferably be eliminated either before or during the process of inspissation, it being immaterial what particular mode of elimination is adopted.

A process of utilizing waste sulphite liquor and product therefrom has been very recently invented by Alexander Mitscherlich, of Freiburg, Germany, and patented in the United States. The process is chiefly intended to collect these liquors and utilize their properties so as to yield products of increased commercial value, and extend their usefulness to various purposes other than the manufacture of paper pulp. The process is based upon the previous removal of the inorganic constituents of the spent liquor by an addition of lime, and the subsequent separation of the organic bodies by dialysis or osmosis. A new article of manufacture also obtained from the spent liquors is a tanning agent.

A process of obtaining an adhesive substance from sulphite liquors suitable for sizing and mordanting was the subject of a patent in 1895.

The use of neutralized solution of the bisulphite waste waters from the lime precipitates, as water for field irrigation, has proved a failure. The gummy liquor stops the pores of the ground, preventing filtration, and rendering the leached waters from fields on which it is used dark and ill smelling. On this account, the storage of the liquor in cemented basins is not to be recommended, since, on standing, the basins became leaky and the surrounding water contaminated.

As to the durability of paper produced wholly or partially from wood cellulose, opinions are still divided, some holding that rag substitutes should never be used for paper that is intended to remain in good condition for long periods. In the case of unbleached cellulose and ground wood no doubt seems to exist, as these materials are known to deteriorate rapidly. The question of durability, therefore, it would seem, can be definitely decided only by a series of systematic experiments extending over a long period of time.

A writer in the Journal of the Society of Chemical Industry for August 31, 1896, makes some comment on the durability of paper made from wood pulp, to the effect that pulp prepared by grinding wood contains ligneous and

other incrusting matter, and the composition is similar to that of the wood itself. Paper made from this pulp turns brown, and becomes brittle and rotten when exposed to the action of light and air for any length of time. Pure wood-cellulose fibers are not affected by light or air, hence it is assumed that the above results are owing to the presence of the incrusting matters. Paper made from brown pulp is less sensitive to light, since the incrusting matter is partly removed by steaming and lixiviating. Cellulose made from wood by boiling with soda stands the action of light and air without turning brown, although it undergoes a change of another kind.

Some years ago blotting paper was made by an American firm from soda wood cellulose, but it was admitted by the makers that after a time the paper lost its absorbing qualities and in a few years it became rotten, the fibers becoming again incrustated. A test of blotting papers several years old confirmed this view. From this and other observations, it is suggested that certain cellulose pulps are liable to return by degrees into the state of the original ligneous fiber. Whether papers made of sulphite fiber will remain unaffected in the course of years, is as yet uncertain; although some paper makers assert that sulphite fiber is as suitable for documents as is rag fiber.

An English patent has been granted to W. J. Ward, Manchester (English patent 15986, September 8, 1900), for the manufacture of waterproof paper, also mineral oil, grease, soap, and the like. According to this patent the spent liquor from the sulphite treatment of wood is evaporated down to 30° Tw., with a definite proportion of sodium or potassium bichromate. It is then treated with more bichromate in a steam-jacketed pan, while paraffin, wax, or the like, previously melted with 2 or 3 per cent of tallow, or 1 per cent of boiled linseed oil, is mechanically incorporated. Finally the product is mixed with the paper pulp in the beaters at a temperature not exceeding 80° F. A mineral grease or soap is obtained in a similar way by removing the calcium salts from the spent liquor and adding 50 per cent or more of mineral oil, with 1 or 2 per cent of tallow, instead of the wax.

The recovery of soda is a valuable side product in the manufacture of paper. The alkaline liquors, in which rags and other paper making material had been boiled, were at one time allowed to run to waste. This is no

longer permitted in economically conducted mills, as the alkali can be recovered in the form of a carbonate, by the evaporation of the waste liquors and the ignition of the residues, after which this carbonate can then be causticized and prepared for renewed use. The soda, during the process of boiling with the paper-making materials, takes up a large amount of non-cellulose fiber constituents, such as resin, coloring matter, and silica. These, on evaporation and ignition, become either carbonate or silicate.

A patent was taken out in 1893 (United States patent No. 492927) for the manufacture of paper board, box board, and the like from old newspapers or other similar printed white paper. In the manufacture of the article, preference was given to printed newspaper or other printed paper possessing the characteristic properties of the ordinary paper upon which newspapers are printed on account of its cheapness, its freedom from size, and its softness. Old copies of newspapers or the overissues can be bought up at low rates and utilized for this purpose. A new article made is a paper board manufactured from old newspapers ground to a pulp, and having the permanent particles of the printers' ink minutely subdivided and uniformly distributed throughout it, so that a smooth and even tint is imparted to the board.

According to the present census 356,193 tons of old waste paper were consumed in paper manufacturing, and crude paper stock, fit only to be converted into paper, was imported and entered for consumption in 1890-1900 to the value of \$3,261,407.21.

Brick Laying Machine.

From Stanbridge, Canada, comes a report of a recent invention, which consists of bricklaying by machinery instead of by hand. The machine, worked by two men and a lad, will lay 400 to 600 bricks per hour. Door and window spaces cause only a slight delay. The machine is suited for all plain work, such as walls, sheds, mills, factories, rows of cottages, piers of bridges, etc. Considerable pressure is put on the bricks, and it is claimed that the work is more firmly done than by hand. The invention will do the work of six or seven skilled bricklayers, and it is believed that a machine adapted to build a factory covering about 60 by 40 feet could be put on the market for \$500.

PATENTS

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been recently procured through the Patent Soliciting Office of E. G. Siggers, Patent Lawyer, Washington, D. C.

Henry G. Rush, Oil City, Pa. Gas-Burner for Firing Barrels.—Mr. Rush is a manufacturer and dealer in all kinds of cooperage, and as a result of long experience and careful study, he devised the machine protected by this patent. The object is to provide a simple heater by means of which barrels may be thoroughly fired without leaving an undesirable residue upon the same, and without the inconvenience of smoke and noxious gases, the machine also being very economical in the amount of fuel used. It includes, broadly stated, a flaring gas-burner of novel construction, which is located upon a base plate that constitutes a support for the barrel. A supply pipe leads to the burner, and an automatic valve is arranged in the pipe, this valve being controlled by an arm arranged upon the base in such a manner that it will be moved by a barrel placed thereon. Thus, when the barrel to be fired is placed in position, the gas will be automatically turned on, and when removed, the supply will in like manner be cut off. The invention also includes a novel form of deflector by which the heat may be distributed uniformly to all parts of the barrel.

William J. Stoffel, Sandusky, Ohio. Bathing Mat.—The present invention is particularly designed for use by travellers, though it may be employed by others and is useful for various purposes. It consists of a flat circular mat, made of rubber or other substance impervious to water and having an upstanding rim around its edge. Handle-straps are arranged in intersecting relation across the mat and have their ends attached at equidistant points about the rim. The person using the device places it upon the floor, and standing in the center thereof can take a shower or sponge bath, after which the mat may be elevated bodily by means of the strap and emptied. When not wanted, it can be folded compactly, so that it occupies very little space.

Lawrence N. W. Smith, Ree Heights, South Dakota. Bicycle Handle Bar. In this invention, a hollow steering head is employed, in the upper end of which is journaled an adjusting stem having a concavous annular groove, a worm-thread being formed on the face thereof. The handle bars are in the form of separate arms pivoted to the head, and having inner convex edges provided with worm-teeth that engage the thread of the stem. Means are employed for adjusting the arms toward and from the stem, and a novel head-holding device or clamp is also employed. By means of the arrangement described, no bolts, screws, or other fastening devices are needed, as in the usual handle bars.

Frank E. Grove, Jamestown, N. Y. Copy Holder.—The copy-holder is intended for use in connection with typewriters, the object being to provide a device of this character, the support of which may be placed in any position convenient, while the copy will be supported in front of the operator and directly over the machine. To this end, he employs a base, upon which is mounted an extensible standard. A horizontally disposed and adjustable arm is secured to the upper end of the standard, and is provided with a downwardly curved stem. On this stem is mounted a rack that is revoluble and vertically adjustable, so as to obtain different inclinations and angles with respect to the arm.

Jess C. Hover, Binghamton, N. Y. Hat Box.—The invention relates to pyramidal hat boxes made of paper,

which have heretofore been so constructed that they must be practically collapsed in order to gain access to their interiors. This disadvantage has been entirely overcome by Mr. Hover, who has provided a knockdown pyramidal box, which when set up is so arranged that the sides may be opened to gain access to the interior without collapsing the structure. At the same time, when closed, the joints are entirely covered to prevent the ingress of all dust and dirt.

Robert M. Downie, Beaver Falls, Pa. Drilling Machine.—The Keystone Driller Company has obtained control of this patent which marks an important advance in these machines. Various improvements are embodied in this one, but perhaps the most important is the counterbalance for the weight of the drilling tools, which lessens the consequent shocks to the operating mechanism. A walking beam is employed, which is pivoted contiguous to one end, the other end supporting a push rod, that extends to the top of the derrick and carries a crown-pulley. Attached to the pivoted end of the walking beam, and on opposite sides of the pivot, is a rope or cable that extends transversely of the walking beam, the ends being adjustably secured together by a powerful coupling, while the ends of the loop thus formed are attached to the frame. This forms a unique counterbalance of great power and does away with the necessity of springs, air-cushions and the like. There are various other features of novelty in the machine, among which may be mentioned the novel means for feeding the drill cable both in lowering and raising the drilling tool.

Robert M. Downie and David A. Messner, Beaver Falls, Pa. Boiler.—The Keystone Driller Company has also been fortunate enough to purchase this patent. The object of the invention is to provide a steam boiler, in which steam may be raised quickly, the drafts being so arranged that complete combustion is obtained. To this end, a supplemental flue or stack extends from the top of the firebox directly through the dome of the boiler, the upper end having a damper, while a cone-shaped deflector is suspended in the firebox below the lower end. A plurality of radially disposed water tubes project inwardly from the walls of the firebox and terminate so as to form a central flue. In starting a fire, the supplemental flue is opened, so that direct draft is obtained and quick heating assured. As the boiler tubes become heated, a draft will be gradually created through the main stack, and in time an indraft will take place through the supplemental flue. This draft can be regulated as desired by the damper, and the air entering from above will commingle with the products of combustion, so that a thorough and effective consumption of all smoke and gases is assured.

Frederick R. Waters, Salida, Colo. Ore Washer. Messrs. Robert C. Powell and Samuel O. Malin, of Baltimore, Md. have purchased the entire interest in this patent, which relates to mechanism for obtaining the large percent of gold that passes with the worthless portion entirely through an ordinary washer, and is lost. An open-ended rotatable casing is journaled in a suitable frame and is made up of detachable sections, within which are located collars spaced from the walls of the casing and having openings. Metallic wings are secured both to the inner and outer faces of the collars at the openings. The interior surfaces of the casing are covered with quicksilver, which, as is well known, has an affinity for gold. In use, the material is passed through this casing, being thoroughly stirred, so as to be brought into intimate contact with the surfaces, the gold thus being separated. The flow of the material is retarded by the collars and after pas-

sing through the casing, it falls into another gold-saving device in the form of a vessel having a conical bottom provided with annular pockets.

David I. Coggin, Waverly, Nebr. Flour Bolting or Sifting Machine.—The invention relates to that class of machines commercially known as plansifters, which consist of a series of superposed sieves operating simultaneously. The object of the invention is to provide means for detachably interlocking the series of sieves against edgewise displacement, during the giratory movement to which said sieves are subjected when mounted in the bolting or sifting machine. The invention consists of the frame members having bottoms provided with corresponding tailings discharge openings, the bottom of the upper member being formed by a screen. The contiguous edges of the frames are provided with a notch and projection interlocking connection which prevent edgewise separation of the frames. The plansifters are coming more into use every year, and the improvements made by Mr. Coggin to this type of machine, will undoubtedly play an important part in increasing the popularity of said machines.

Henry T. Emeis, San Francisco, Cal. Ear Label.—The object of Mr. Emeis' invention is to provide a stock-marking tag, which may be readily attached to the animal's ear, and when once associated therewith will be firmly held from disengagement. A substantially V-shaped clip is employed, which is arranged to embrace the ear of an animal, and is provided with correspondingly disposed terminal perforations. A cutting ferrule is arranged between the members and is alined with the perforations thereof, this ferrule being passed through the ear. A fastening device is inserted through the perforations and the ferrule, one end of the device being pointed and adapted to be upset against the outer face of one end of the clip, while the opposite end is enlarged and has a splitting, carrying a tag which constitutes the marker.

Charles Linstrom, Vicksburg, Miss. Combined Feed Water Siphon and Trap.—Mr. Linstrom has recently secured another patent for a novel type of feed water siphon, designed particularly for supplying water to the locomotive boiler from the tender tank. The siphons heretofore employed for this purpose have been difficult of application, and have been particularly troublesome in winter, because of the derangement of the parts through the relative movement of the walls or sheets of the tank. These difficulties are overcome by mounting the legs of the siphon one above the other, and by so connecting them with opposite tank walls as to permit their relative endwise movement to accommodate the movement of the walls. The two legs are connected by a return dome, located above the tank and capable of being readily removed to give access to the interior of the siphon. Before passing into the siphon, the water is cleared by passing through a trap secured to, and readily removable from, the under side of the tank. One siphon leg is attached to and supported by the trap, and the other is similarly secured to the dome, and therefore, when a disorganization of the apparatus is desired, it is simply necessary to detach the trap and dome from the tank and remove them bodily with the siphon legs attached.

The arrangement is most ingenious, and, what is more, is a thoroughly practical invention by a practical mechanic.

Gustav Holtz, Inventor, Gouldsboro, Pa.; American Dental Manufacturing Company, assignee. Scranton, Pa. Dental Chair, Foot Powder, and Wall Bracket.—Three patents have recently been issued to Mr. Holtz. The first is for a dental or surgical chair having improved mechanism for facilitating

the adjustment of the chair back and its rigid support when adjusted. The back is mounted to swing from the chair seat, and the latter is provided with a supporting arm or lever, carrying at its upper end a shoe slidably engaging a guide on the chair back. By means of an ingenious locking device, the back is automatically released when an attempt is made to raise it, and is automatically locked in position after it has been properly adjusted to suit the convenience of the patient. When it is desired to lower the back, it is simply necessary to move a small protruding handle which unlocks the back, and thus permits its depression.

The second patent is for a novel foot power, designed with special reference to the operation of a polishing lathe, or other form of light machinery, at a high rate of speed. A fly wheel is connected, as by a belt, with the lathe spindle, and is equipped with a ball clutch, by means of which a sleeve when rotated in one direction engages and operates the fly wheel. Below the driving shaft, on which both the sleeve and fly wheel are mounted, is located a treadle, and adjacent to the axis of movement thereof, a spring is connected to a fixed part of the machine frame. A flexible strand is connected at its middle to the opposite end of the spring, and is doubled upon itself to form a double strand. This double strand is wound upon the sleeve, and its extremities are connected to the treadle at a point adjacent to the foot piece thereof. When the treadle is depressed, the sleeve is rotated, and the clutch automatically engages the fly wheel to rotate the latter at a high rate of speed. The fly wheel continues to rotate, and the spring retracts the treadle, to position the parts for a repetition of the operation. While the foot power is extremely simple, and very inexpensive, it is highly efficient for driving light machinery at a high rate of speed.

The third patent is a wall bracket adapted for dentist's use to support tool trays and the like, and the novelty thereof resides in certain attachments and movements, the bracket being capable of swinging movements in both vertical and horizontal directions, and also adapted to be extended in a horizontal direction. The body of the bracket is of skeleton formation, and is provided with upper and lower trunnions which are rotatably mounted in suitable bearing brackets adapted to be connected to a wall or other support. The said body has an arcuate friction surface. A vertically swinging arm is bifurcated at its rear end and straddles the body, and is pivoted thereto concentrically with relation to the arcuate portion thereof. A loose friction roller is connected to the swinging arm, being mounted in a peculiarly shaped recess thereof, and bears frictionally against one wall of the recess and the outer face of the arcuate portion of the body, a spring being provided so as to bear against the friction roller and hold it to its work. The swinging arm carries a trip rod, the inner end of which works in a perforation, provided at the inner end of the swinging arm in operative relation with the upper side of the friction roller, so as to hold said roller out of engagement. Said trip rod has its front or outer end pivotally connected to a thumb-piece, which is pivotally carried by a cross head mounted on the outer end of the swinging arm. The cross head is pivoted to the swinging arm at an intermediate point, and has its lower end connected to the main body by means of an adjustable rod. The upper portion of the cross head is provided with a pair of parallel open-ended tubular sockets, which adjustably receive rods, said rods passing through corresponding sockets which are carried by the underside of the dentist's table or tray. The table can be adjusted back and forth on the rods, or can be moved with the swinging arm up and down, or horizontally, and held in any adjusted position.



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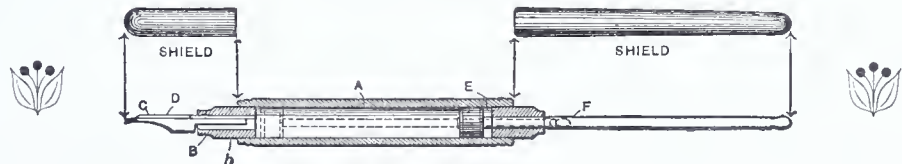
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WASHINGTON, DECEMBER, 1902.

Patent Commissioner's Report.

The report of the Commissioner of Patents for the year ending July 1, 1902, shows that the number of applications filed during the year is greater than during any other recent year, and indeed, is the greatest in the history of the Patent Office, having for the first time exceeded fifty thousand. This, in spite of the fact that the number of design patent applications is less by 561 than for the preceeding year. The decrease in the number of applications for design patents was due to the new construction given to the old design patent law by the Patent Office following certain decisions of the courts; also to the effect of the new design patent law, which was enacted last spring.

In speaking of the increase in the force and its effect on the condition of work in the Patent Office, the Commissioner stated: "although the number of pending applications had increased considerably before this additional help became available, it is hoped that the examining corps as now constituted will be able to take care of the business of the Office."

The Commissioner reiterates the oft-repeated complaint of his predecessors that, "the growth of the business of this Office and the accumulations of its records continue to add to the necessity for more room, and I can only repeat the suggestion made in my report of last year, that if more space were provided for the operations of this Bureau, it would result in a saving of time and valuable documents and in more economical methods of work."

The work of classification of patents in the Patent Office has progressed satisfactorily during the last year, and twenty additional classes have been reclassified. The Commissioner states that "this work would have progressed faster if it had not been necessary to reduce the available force to aid the examining divisions."

During the past year the scientific library has been established in new

quarters, and as soon as the new steel stacks, for which Congress has already provided sufficient funds, have been completed, the library will be in much better shape than ever before. The Commissioner recommends, however, that the appropriation for the purchase of books for the library should be increased. Of late years the appropriation has amounted to \$2,000 per annum. A good deal of this is used to pay for transporting publications of patents issued by the Patent Office to foreign governments. Within the last six months, the Patent Office has been obliged to forego the purchase of at least \$800 worth of books which had been recommended by examiners and attorneys. The Commissioner recommends that \$4,000 be appropriated, and states that it could be used to the great advantage of the service and of inventors.

All patents issued during the greater portion of the present year have been signed by the Commissioner of Patents alone, this being due to an amendment made to Section 4883 of the Revised Statutes, by virtue of which patents no longer contain the signature of the Assistant Secretary of the Interior.

The Patent Office has recently instituted the practice of publishing more of the Commissioner's decisions in the *Gazette* than formerly, making it necessary to eliminate many of the court decisions. This is for the purpose of having the body of decisions, controlling the practice in the Patent Office, made public, rendering it unnecessary for the various officials in the Patent Office to cite manuscript opinions, which has always been considered a hardship by the attorneys practicing before the Patent Office, as the only way to obtain access to a manuscript decision was to order a copy of the same, or make a personal visit to the Patent Office and inspect the original records.

No series which has appeared in any magazine is more interesting than that which the *Cosmopolitan* is publishing under the title "Captains of Industry." The names of the men included in this series are not only constantly appearing in the news of the day, but their lives almost always illustrate the development of an entire art or industry. Take, for instance, those included in the November number. From Chaldean clay tablets to the movable types of Guttenberg lies a period of ten thousand years. From Guttenberg to Robert Hoe the gap in processes and results is quite as broad, though in time it is only five centuries long. The scribe of Nippur probably produced one tablet an hour. Guttenberg may have finished one sheet a minute. Hoe prints, with his machine, a strip of paper three feet wide on both sides at the rate of one hundred and twenty miles an hour. The life of the late W. S. Stratton, incidentally, is interwoven with the mining development of the middle West; that of James R. Keene illustrates the highest development of the Wall Street speculator; that of Tom L. Johnson casts interesting side-lights on political conditions in Ohio; while the life of Ferdinand W. Roebling cannot be written without a thorough knowledge of the wonderful evolution of modern bridge-building.

A New Decision in Copyright Matters.

An interesting case has recently been decided by the Circuit Court for the Northern District of Illinois. It is the Tribune Company of Chicago against the Associated Press.

It appears that the publications complained of were contained in daily newspapers, which were supplied by the Associated Press, and related to news of the South African war and editorial comments appearing in the *London Times*, abstracted on the part of the Tribune Company of Chicago immediately before publication in London, under an arrangement with the publishers of the *Times*, and cabled to the *Tribune* by the agent of the latter, and published in its first edition in Chicago on the same morning of the publication in the *Times*, the difference in time between this country and London favoring such a result.

The bill averred that the defendant procured the matter so cabled from the first edition of the *Tribune* and furnished it to the morning papers of the association for appearance in their second editions, but this allegation was disproved by the answer and exhibits of original cablegrams, showing that the matter furnished by the Associated Press was taken by its agency in London from the *Times* immediately after publication, cabled to New York, and thence transmitted to the papers of the association.

The *Chicago Tribune* alleged copyright protection on the matter referred to, the copyright being obtained by depositing in the postoffice at Chicago on the evening before the publication, the general title of the newspaper, *Chicago Daily Tribune*, with serial number and date, and by like deposit immediately after publication, of copies of the completed paper, each addressed to the Librarian of Congress, and followed by registration and certificate in due course.

No special matter was indicated in the applications as subject to copyright, but the newspaper was entered as an entirety. The Court held that it was questionable whether a copyright could thus be secured for a newspaper; and however might be the ruling with reference to the original matter published in each form, that there can be no general copyright of a newspaper composed in large part of matter not entitled to protection. That since the exclusive right of publication at common law terminated with the publication in London, no protection existed beyond that expressly given by the statute: that before the amendment authorizing copyright in America on foreign publications under prescribed conditions where the publication is simultaneous, such foreign property was left unprotected; and under the amendment, whatever rights might be invested either in the *Times*, or the *Tribune* through contract with it, to copyright any editorials or special matter, could be exercised only for matter set apart for the purpose and so distinguished in the publication, and that the publication in this country must be substantially identical with that in the foreign country to bring it within the intent of the statute. That as the matter in controversy were mere selections from several cablegrams and editorials in the *Times*, not previously designated for copyright here, and not so intended on behalf of the *Times*, it did not seem to conform to the statutory requirements, and the motion for injunction was denied.

Literary property is protected at common law to the extent only of pos-

session and use of the manuscript in its first publication by the owner. With voluntary publication the exclusive right is determined at common law, and the statutory copyright is the sole dependence of the author or owner for a monopoly in the future publication.

If the *London Times* in printing the special matter referred to had endorsed thereon "American Rights Reserved," and before the publication in their paper, had arranged by cablegram for the copyrighting of each article in the United States, the suit against the Associated Press might have been maintained. We presume that in the future, the *Chicago Tribune* will adopt some such plan as has been suggested, in order to control the exclusive right to publish the matter referred to.

SEEKING PERPETUAL MOTION.

Inventors Learn Nothing From the Failures of Centuries.

"The perpetual motion crank," said a Patent Office chief of division, "is with us always, knocking at every door of every department. His mechanism is not only to run itself, but is to supply the power for machinery of all kinds, sewing machines, clocks and everything else. Formerly we gave some time to applications of this sort. Now, when we suspect that an applicant has the perpetual motion bee in his bonnet, we ask for a working model. That is the last we hear of it. A few months ago I was visiting in New York, and met a bright young man, a druggist. After my return I got a long letter from him, saying that he was sure he had discovered perpetual motion. I treated the matter seriously, and wrote him not to go to the expense of employing attorneys or making an application, but to get up a working model, and after it had run several months to let me know, and I would advise him further. Six months later I received a postal on which he had written simply the words: 'Machine wouldn't work.'

"Some of the enthusiasts on this subject are in earnest, while many are fakirs, who attempt to deceive us for the advertisement it would give their patents. An attorney told me the other day that he had a working model submitted to him a short time ago that seemed to be without a defect. He had gone so far as to draw up the papers for an application on it, when a young man in the office noticed what seemed to be a joint in the wooden base of the device. He pried this open and found a steel spring within, which by an ingenious arrangement supplied the power. One of the mysteries of France was a self-winding clock that seemed to run on forever. It got out of repair, however, and the workmen found a shaft through the wall into a chimney. At the end of this was a windmill whereby the heat of the chimney kept the clock wound up.

"Our applications are confidential, and become public only when passed on, so that I cannot refer to them, except generally, but some of them are interesting. As a rule they are modifications or copies of some exploded principles. Dr. Henry Dircks treated this subject exhaustively a few years ago in a work published in London in which he said: 'The tyro in mechanical invention has only to study the elementary mathematical and mechanical sciences, together with the present history of seven centuries occupied in efforts to realize a veritable mechanical, perpetual motion, to satisfy himself by conclusive evidence that the pursuit is no other than a most tantalizing delusion and an infallible snare.'—*Washington Star*."

SCIENTIFIC

PROGRESS.

Wanted—A Simple Device to Automatically Feed Oil to Furnaces.

Notwithstanding the fact that the coal strike has been settled, both the Patent Office and the public are doing a very lively business in looking into inventions for burning oil for fuel purposes and for the production of power. In this city, several oil burners are being exploited, and the same is true in other cities. The result of investigations cannot fail to be prolific of good to the public at large. The use of coal may decline to some extent as a result of the increased use of oil. No one but the coal operators, will however, object to this result. It is not generally known that there have been granted up to date, over 1,200 patents for using oil as fuel, while for the use of gas and vapors over 2,700 patents have been issued. The Patent Office is now receiving weekly, applications for patents in these two classes to the average number of twenty-five, fifteen of which are for crude oil burners for household purposes, steamboats and manufacturing plants.

There are two main lines of inventions which may be utilized for these purposes, and the same have been patented for many years. One is for supplying the oil mixed with steam for combustion, and the other turns the oil into vapor and then burns the vapor. These two plans for utilizing oil for fuel are at the base of a multitude of inventions which are recorded in the Patent Office, and are still coming in daily. No one has as yet evolved any new principle for burning oil, and it is believed that when the problem has been worked out so that oil may be conveniently used for household purposes, it will be done along the lines of improvements on existing devices.

The main idea connected with the burning of oil for fuel purposes were worked out fifteen years ago, and an attempt was made to put them in practical operation. At that time there was a good deal of uncertainty felt in regard to the price at which oil could be bought, and it was necessary that a feeling of confidence should exist in the trade before the subject of oil for burning should be entered upon. The New York Central tried the experiment, but difficulties were encountered, and they gave it up. Oil was then selling for \$1.25 a barrel, but since the discovery of oil in Texas, which has brought down the cost of oil to 30 cents a barrel, and coal having increased in price, the whole problem is placed on another basis, and inventors and others are working energetically to devise some practical plan.

Not a single private residence in this city is today heated by the use of oil. The small oil stoves are not counted because they are only suitable for heating a single room. The difficulty in the use of oil for the purpose of operating a heating plant for a house, lies in the fact that the feeding of the oil to the flame to maintain combustion requires rather an elaborate

apparatus. Inventors have not yet devised means for automatically feeding oil to furnaces in such a simple form as to make it practical for the small household. One who can originate means of this character will make his fortune. There is no doubt that it will be done in time, for we believe that the American inventor can do most anything, when he learns the difficulties in the way and sees the need for improvement.

German Substitute for Celluloid.

The extensive commercial use of celluloid has caused a great many people to try to find substitutes for, or imitations of, it. In Germany, a popular imitation has been made by dissolving in 16 parts—by weight—of glacial acetic acid, 1.8 parts of nitro-cellulose, and adding 5 parts of gelatin. Gentle heating and stirring are necessary. After the mass has swollen, it is mixed with 7.5 parts of alcohol (96 per cent), and stirring is continued. The resulting product is poured into molds, or, after further dilution, may be spread in thin layers on glass. As an underlay for sensitive photographic films, the material has important advantages, not the least being that it remains flat in developing.

Fireproofing Cotton Goods.

Dr. W. H. Perkins, of Manchester, England, has made a valuable discovery, whereby cotton and other similar highly inflammable materials can be rendered permanently fireproof. With the exception of explosives, there is no article that flares up so quickly as cotton when it comes into contact with a light, especially in those particular goods which are made of heavy yarns and "combed out" on both sides in order to give the appearance of flannel. The fireproofing process consists of "asbestinizing" the fabric, by which means permanent immunity from burning is assured, but the exact manner in which it is achieved is not divulged. "Asbestine fabrics" can be washed again and again and yet retain their nonignitable quality. From this it will be seen that the process does not consist in merely putting upon the material a chemical that for the time being renders it noninflammable; but rather, as in the case of mercerizing, in changing the very character of the material. "Asbestined" cloths are said to be perfectly hygienic, and can be safely worn next to the skin.

A New Electric Fan.

Mr. Benjamin Blum, of New York City, has just obtained a patent on an electric fan, the object of which is to provide a simple and cheap form of mechanism, whereby the motor and its fan will be continuously rotated bodily to cause the room or space in which the fan is located, to be intermittently swept by the blast of air created by the blades of the fan.

The motor having a rotatable support is mounted on a pedestal or base, between which and the motor-support is interposed a bearing, affording the motor a motion upon a vertical axis. The type of motor is not material; but a common form having a spherical field-magnet is the type usually employed. The armature-shaft extends through each side of the field magnet

and carries on one end the regular ventilating or air-circulating fan, and at the other end a small bevel-pinion. This bevel-pinion engages with a smaller pinion, mounted upon a short shaft at right angles to the armature-shaft in a bearing in a bracket projecting from the field-magnet frame. The opposite end of this short shaft carries a comparatively small fan or air-propeller, which is rotated by the motor at the same time the larger fan is rotated. Since the axis of this small fan is at right angles to the vertical axis of the motor, the small fan will bodily rotate the motor on its vertical axis whenever it is permitted to turn with the armature-shaft. The fan-motor will, therefore, have a constant rotary motion on its vertical axis, and the blast of air sent out by the larger fan will sweep the apartment or space in which the motor is placed at regular intervals.

A New Wave-Detector for Wireless-Signaling.

A very broad patent has just been granted to Mr. Lewis T. Rhoades, of Phoenixville, Pa., on a wave-detector for wireless-signaling systems.

The invention relates to a device for manifesting the presence of electro-radiant energy and which is extremely sensitive, reliable, and not easily rendered useless.

It comprises a wave-detecting device which changes its resistance under the influence of electromagnetic radiations, and immediately restores itself to its normal condition upon the cessation of the radiations, and is in its finished state in the nature of a paste. In compounding this paste or material for the wave-detecting device, mild steel is employed in the form of very fine particles, and also French carbon which has been reduced to very fine granules. To equal portions of the mild steel and carbon is added twenty per cent. nickel, also in a fine state, and these ingredients are mixed with enough vaseline to make the whole mass a thick paste. This paste is then placed between metallic terminals, which are then included in the circuit of the receivers of wireless-signaling systems in the well known relations.

The wave-responsive device or wave-detector here described has the property of self-restoration—that is, upon the cessation of the electroradiant energy, it returns automatically to its normal condition and does not require mechanical shock.

A New Process of Welding Aluminum.

A simple process of welding aluminum has been discovered by Mary Wiszniewska Emme, of New York City. She describes the process as follows:

"The object of my invention is to provide a simple and effective process of welding aluminum or alloys of aluminum by means whereof a perfect, homogeneous, and permanent junction of the two ends of the metal may be accomplished.

"I have discovered that by heating two contacting ends of aluminum under suitable conditions approximately to or above the temperature of 600 degrees centigrade, welding can be effected.

"The invention consists in bringing

the two or more pieces of thoroughly-cleaned metal or the two ends of the rods or wires of the metal into contact, and applying a sufficiently high degree of heat to raise the parts to be united to the welding-point, whereupon they may be welded together. To carry out my process successfully, the parts or ends to be united must be scrupulously cleansed before heating to the welding-point. The degree of heat required is approximately 600 degrees centigrade and may vary, frequently requiring a slight excess. The correct temperature is reached when the aluminum commences to soften. By applying this heat when the parts are in contact they may be united or welded, whereby the mass or piece formed possesses throughout the same physical qualities as though the parts had never been separated—that is, the same tensile strength, the same flexibility, the same conductivity for heat or for electricity."

A New Process for Hardening Metals.

In certain industries sheet metal is required having a greater density and degree of hardness than is obtainable in the ordinary process of rolling the metal into sheets. Recourse has heretofore been had to hammering for the purpose of hardening the sheets. A special instance where a particularly hard metal is required is in the case of zinc plates employed for the manufacture of printing plates and blocks. These plates at present have to undergo considerable hammering and other manipulation, whereby their cost is considerably increased. Mr. Johanny Dejeu, of Lyons, France, has just patented in this country a process by which metals, and in particular zinc, may be hardened to an extent practically the same as was heretofore obtained by the above-mentioned hammering of the previously-rolled soft-metal sheets. In carrying out the invention, for example, with sheets of zinc intended for use in the manufacture of printing-plates, a sheet of zinc soft-rolled as it comes from the ordinary mill-rolls, and of approximately the length and breadth desired in the finished sheet, is taken and placed between two iron or steel plates of approximately the same size. These iron or steel plates are not polished, but are unpolished or may, in fact, be slightly roughened on their faces placed in contact with the sheet of zinc to be hardened. The sheet and plates are then together entered between the rolls and slowly rolled. It is essential that the rolling take place slowly, so that a slow progressive compression action is exerted upon the sheet and plates, gradually passing from one end of the same to the other. By this operation the molecules of the zinc sheet are compacted together. The length and breadth of the sheet of zinc are not materially altered; but the metal is by reason of the compression action rendered harder and of a finer grain, susceptible of a higher polish and finish and better adapted for the purposes for which it is designed. The plate is rendered of uniform density and texture throughout, instead of, as by the ordinary rolling, being slightly harder at the edges than at the center.

HOW A CHIMNEY - - - - - - STACK IS RAZED.

VISITORS to Washington in the last few years have probably noticed near the Treasury Department on the south side of Pennsylvania avenue a tall chimney stack standing alone in an open square filled with rubbish. Looking at it from the avenue, one could see in the distance the towering shaft of the Washington Monument in

this plan was abandoned. The contractor who had it in charge then started to remove the bricks by hand for about sixty feet of the structure, leaving the remaining eighty feet to be thrown to the ground by the use of dynamite placed in holes drilled near the base of the chimney.

The felling of a tall stack is an in-

the engine set in motion, pulling the rope taut. The severe strain on the rope soon had the desired effect on the structure, and presently the chimney toppled over with a loud crash and lay a broken mass of bricks upon the ground. The bricks, however, fell in no certain place and that method was regarded as a crude arrangement.

One of the most successful methods of razing tall chimneys is to cut away nearly two-thirds of the base and substitute thick wooden props. These are afterward set on fire, and directly they are consumed the chimney, deprived of its foundations, falls down. The space in which the chimney is to fall is calculated, and the steeple "feller" begins his work. The props are placed under the side facing the space in which the stack is desired to fall. The workmen then remove a wide portion of the masonry in the center of the section facing the direction of descent. Into this space a long thick timber beam is placed to support the side. The reason for making this enlarged gap in the base of the chimney is to insure its telescoping—that is, breaking into two or three pieces as it falls over. If only a narrow cut were made the chimney would topple over in one huge mass, measuring the same length on the ground as it towered into the air. The work is by no means lacking in the element of danger, as in the underpinning great care must be used to prevent the mass of brick and mortar from tumbling about the heads of the workmen, especially in the case of old and decrepit stacks.

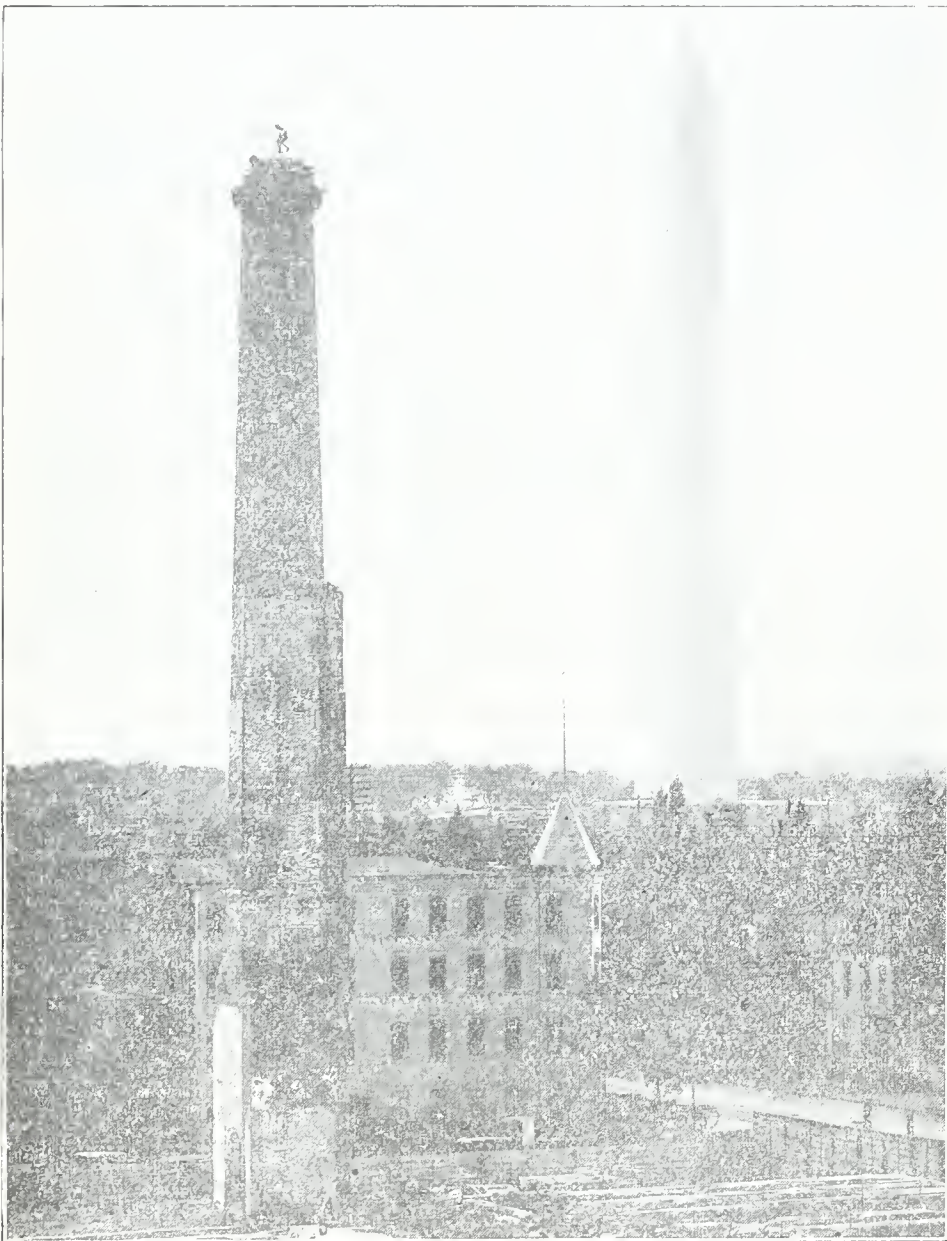
After the underpinning has been successfully accomplished a great fire

is built under the chimney and around the props. The fire must be carefully watched in order that the wood may burn evenly and the props may collapse at the same time, and it is necessary that the person in charge of the work shall stand near the fire with water so as to keep an even blaze. When the chimney begins to settle and groan, as it is called, the person superintending the razing seeks a spot out of danger, and the great mass of masonry falls to the ground, buckling up into several pieces like cardboard.

In felling the chimney shown in the illustrations, four holes were bored around the north side of the chimney base and the adjacent corners. Twenty-five pounds of dynamite was placed in the holes, the plug inserted, and the switch to the electric wire controlling the fuse was located some distance off. On giving a prearranged signal, the switch was turned on, and the blast went off. For a moment the tower heaved: its whole vast weight was lifted straight upwards. Then it fell directly at its own base in sections broken off simultaneously from the top.

It is estimated that the stack contained over 175,000 bricks, which, by reason of the agreement made with the contractor, became the property of the latter.

The two illustrations show the stack under different conditions. The first one represents the stack complete just as it stood at the time the bicyclist was giving the daily exhibitions. In fact, the rider can be plainly seen on his wheel. The second illustration shows the stack with about sixty feet of its height removed, and the remaining portion toppling to the earth under the force of the explosion which has taken place.



THE STACK COMPLETE WITH BICYCLER GIVING DAILY EXHIBITIONS.

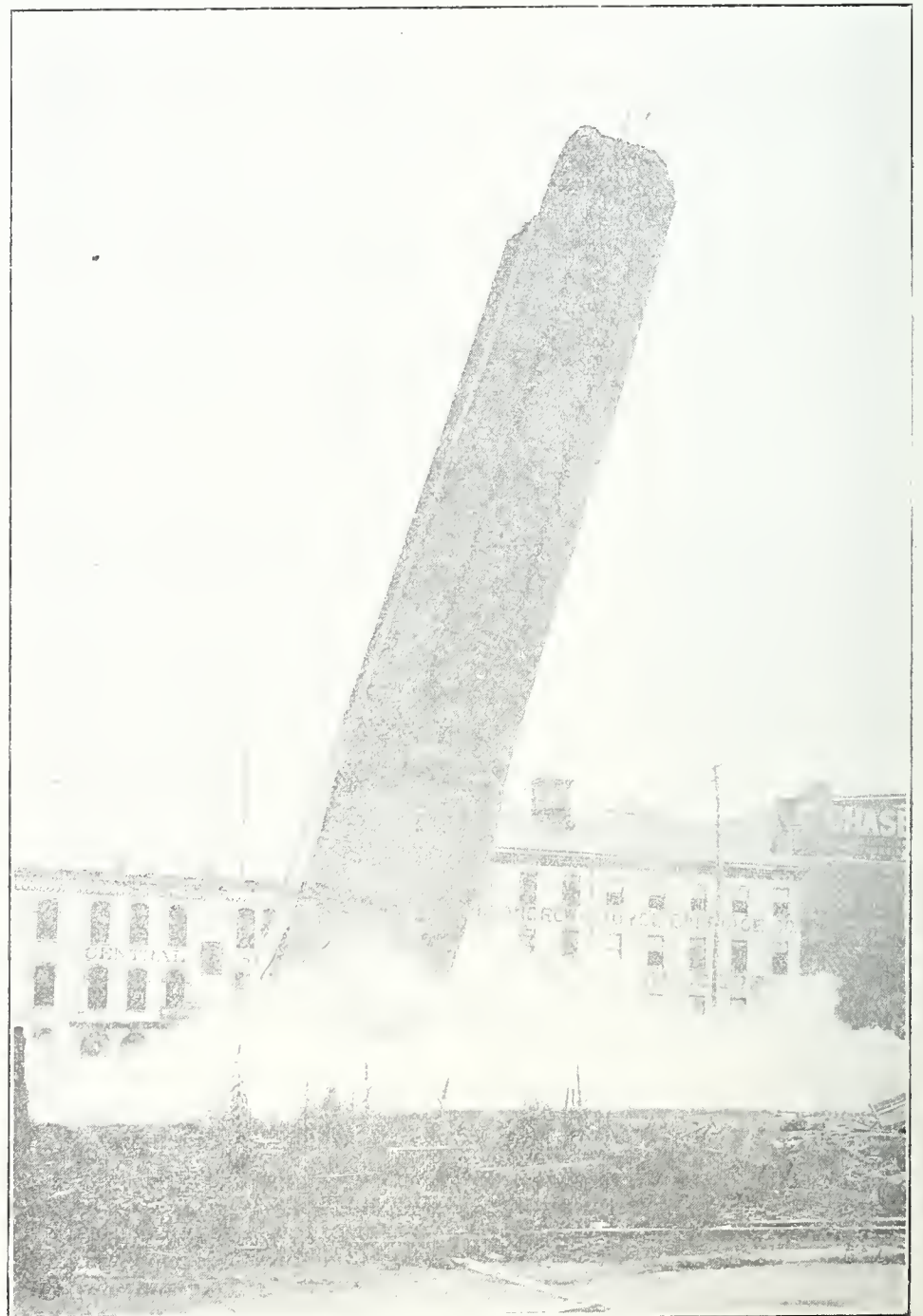
all its simplicity and grandeur. The stack was all that remained of the power house of the Capital Traction Co., when it burned to the ground. For years it stood thus in seeming defiance of the elements, but the hand of man who erected it, was to be the instrument of its destruction.

An enterprising bicyclist, four years ago, built a scaffolding within the chimney, by which he was enabled to mount to its top and give daily exhibitions on a stationary wheel. One could plainly see the rider for miles. He appeared to be circling around the top of the stack and going at a great speed, when in point of fact his wheel did not move from its fixed position.

The government having purchased the ground from the Capital Traction Company as a site for the new municipal building, it became necessary to remove the brick stack. It was at first intended to remove the entire structure of one hundred and forty feet by dynamite charges, but because of protests received from property holders nearby,

interesting piece of work, to say nothing of the hazardous chances connected with it. In late years it has become an art with some "steeplejacks" who devote their time to this sort of work, and the felling of a great chimney always becomes the source of attraction to a great number of curious spectators. In fact, the felling of the chimney made such an impression on the mind of one man, that within a few weeks thereafter, he tried the same plan by blowing up one of the hotels in Washington. Fortunately he was the only victim of the mad attempt.

A method used many years ago, when the stack was to be brought down promiscuously, and without regard to any definite space which the debris should cover, was to fasten a long hawser about midway up the chimney. The bricks from the base of the chimney on the side facing the space into which it was to fall, were then cut away, and an engine was brought upon the scene. The other end of the hawser was then fastened securely to the locomotive and



THE STACK TOPPLING TO THE EARTH UNDER FORCE OF EXPLOSION.

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Latch..... W. S. Bartholomew
Latch. Door..... S. M. Morse
Lavatory..... J. T. Moore
Lead. Manufacturing white..... C. H. Vickerman
Leather press..... J. Thomson
Leather stretching apparatus..... T. Murdoch
Lemon squeezer..... C. A. White
Linotype machine..... G. A. Bates
Linotype slug slotting apparatus..... J. Roxburgh et al
Liquid controlling and measuring device..... G. Wiberg
Liquids. Means for ascertaining the level of..... C. May
Loading device. Vessel..... W. F. Mills
Lock and latch. Combined..... H. A. Schroeder
Log car stake holder..... O. S. Perkins
Logging cars, &c. Dog attachment for..... G. T. Hudgens
Loom for weaving tufted fabrics..... H. Wyman et al
Loom pattern mechanism..... C. Alvord
Loom shuttle..... H. Lindsay
Loom take up..... J. Mirth
Looms. Oscillating lease rod for..... H. Wilde
Lounge. Folding..... R. Sanders
Lubricating device..... S. W. Wardwell
Mail bags, &c. Fastening for..... R. H. Easdown
Mail pouch crane and hanger..... L. W. Barker
Manger..... A. C. Faust et al
Match machine..... W. H. Parker
Meat hook..... F. D. Broga
Meat smoking apparatus..... C. H. Evers et al
Mechanical movement..... D. H. Haywood
Metal ornamentation..... T. Hausermann
Metal sheets or strips. Apparatus for separating packs of..... J. H. Swindell
Metal wheel..... W. P. Bettendorf
Mileage or percentage sheet or chart for public carriers..... F. H. Jones
Milk can..... E. H. Carswell
Milk in dry form. Preserving..... J. A. Just
Milking apparatus..... S. Henry
Milking machine..... J. C. Matthews
Mineral substances by heat and pressure. Treating..... V. Karavodine
Miner's hoisting hook..... C. F. Pohlmann
Mold cutter..... W. H. Ford
Motor..... H. J. Schmick
Motor control system..... W. B. Potter
Motor controller..... G. E. Krause et al
Motors to machines. Means for connecting..... C. E. Donnatin et al
Mower. Lawn..... W. S. Colwell
Mowing machine..... E. Potter
Muffle furnace..... G. G. Conners et al
Music leaf turner..... J. E. Solomon et al
Musical instrument automatic playing attachment..... C. E. Peterson
Nailing machine nail controlling mechanism..... F. O. Tobey
Neckband shaper..... D. B. Ashman
Negative retoucher..... P. Frankois
Nut lock..... G. W. Whitehurst
Nut lock..... M. E. Byers
Nut lock..... J. W. H. Cannon
Nut lock..... W. D. Evans et al
Obtundent handpiece. Hot water..... A. F. Merriman, Jr
Optical instrument for testing the eyes..... G. R. Porter
Ore furnace..... W. A. Koneman
Packing. Rod..... A. B. Elliott
Paper bag machine..... D. Appel
Paper making machine suction box..... W. H. Gage
Paper stock treating machine..... J. A. Mullen et al
Penholder..... G. B. Hunt
Permutation lock..... M. B. Mills
Piano pedal action..... J. Dierdorf
Pigment. Manufacturing white..... J. B. Hannay
Pillow. Wire..... C. A. Way
Pin..... G. W. McGill
Ping pong net support..... L. H. Nelson
Pipe coupling..... C. L. Wilmot
Pipe elbow bending machine..... E. H. Smith
Pipes or tubes. Die for tapered..... W. Smith
Planter clutch. Corn..... L. P. Graham
Planter. Corn..... C. W. Michael
Plastic materials. Machine for molding articles from..... J. Simons et al
Plated table utensil..... G. Brabrook
Plow. Subsoil..... T. J. Hubbell
Pneumatic despatch tube system..... 2 pats.
Punch and spacing tool. Prick..... L. S. Starrett
Punch. Hand..... W. A. Bernard
Punching bag support..... S. Maxwell
Potato digger..... D. Y. Hallcock
Primer. Combined percussion and electric..... W. Mason
Printers' plates. Punch for mortising..... R. J. Kittredge
Printing press..... reissue..... J. L. Firm
Printing press perforating and scoring device..... W. T. Cole et al
Propulsion. Marine..... R. B. Hewson
Propulsion. Steam vessel..... C. A. Parsons
Pulley block..... G. Avery
Pump connection..... F. F. Stevens
Pump. Liquid measuring..... C. P. Mosher
Pump. Rotary..... O. C. Jones
Pumping machine. Gas..... S. L. G. Knox
Racking apparatus for filling barrels..... S. M. Rhoads
Railway crossing gate..... E. C. Radick
Railway frog..... P. J. Huson
Railway gate..... C. M. Ross et al
Railway. Pleasure..... 3 pats.
Railway. Elevated track, bridge, &c. Overhead..... G. Barker
Railway. Scenic..... C. H. Pfuntner et al
Railway signal..... R. A. Baldwin
Railway switch. Street..... W. R. Dunham, Jr
Railway system. Electric..... 2 pats.
Railway tie..... T. M. Lee et al
Railway tie and rail connection..... C. Gardner
Raising, lowering, transporting, and discharging materials. Means applicable for use in..... H. A. L. Barry
Range..... J. F. Ruth et al
Ratchet drill..... O. A. Schultz
Rattling mill..... A. M. Hewlett
Razor blade safety guard attachment..... J. J. Duket et al
Razor safety attachment..... W. Schuch
Razor strip surfacing tool..... J. P. Knight
Recording and adding machine..... G. W. & A. L. Dudley
Reflector. Gas or electric..... R. D. Gates
Refrigeration. Mechanism for automatic control of..... C. D. Sword
Relay. Electrical..... A. T. M. Thomson
Reversing mechanism and brake. Combined..... J. Ralder
Revolving, reclining, and rocking chair. Convertible..... A. A. Van Slke
Rheostat..... G. H. Whittingham
Roadway..... W. E. Jaques
Rock drill..... J. Puechagut
Rock drill tripod..... W. Wood
Rotary engine..... G. Westinghouse
Rotary engine..... R. McGregor
Rotary engine..... M. I. Hewlett
Rotary engine..... D. B. & O. D. Kingsbury
Rotary machines. End play device for..... W. B. Potter et al
Rubber heel for boots or shoes..... G. W. Lewton
Safety knife..... W. C. Heimerdinger
Safety pin..... M. G. Lippincott
Saw holding device..... J. H. Miner
Saw tool..... E. L. Post
Scraper. Rotary..... R. H. McCaughy
Screen..... H. L. Sanders
Screw making machine..... F. Curtis
Seed, grain, or fertilizer drill..... R. D. King
Sewer pipes. Test trap or seal for..... C. M. Breen

Sewing machine. Double chain stitch..... A. Routke
Sewing machine needle bar mechanism..... A. Routke
Shade holder..... A. W. Hoffmann
Sharpening and dresser for mill runners..... L. D. Colley
Show case corner clamp..... L. Paulle
Sifter..... R. Marter
Silk. Manufacture of artificial..... H. Bernstein
Singletree or doubletree..... J. M. Dunlap et al
Skein holder..... J. O. West
Sleigh..... P. Martinson
Slicer. Vegetable..... H. L. Bailey
Smelting and refining volatile metals..... J. Armstrong
Smoker's pipe..... H. W. Rice
Snap. Harness..... L. A. Parsley
Soldering iron..... A. G. Kaufman
Sound reproducing apparatus..... D. Higham
Spectacles..... A. H. Strassburger
Spinning machine flier..... J. & H. Wright
Stacker for threshing machines. Pneumatic..... O. O. Bodvig
Stair lift..... J. M. Dodge
Stalk or weed cutter..... T. A. Wood et al
Stall..... S. H. Frost et al
Stanchion..... G. B. Rogers
Steam boiler..... 2 pats..... H. L. Wilson
Steel concrete construction..... C. Weber
Stereopticon. Coin controlled..... F. Duwe
Sterilizing apparatus..... A. Watorck
Stitch separating machine tool..... J. B. Hadaway
Stocking..... M. Lamond
Stone. Fireproof lime sand..... J. Horak
Storage battery..... B. Ford
Stove attachment. Gas or gasoline..... T. R. Warren
Stove. Hot air..... D. Lamond
Stove or furnace oil burning attachment..... H. A. Cordray
Stretching apparatus..... J. W. Dimick, Jr. et al
Stuffing box. Steam engine..... J. M. Rockwell
Stuffing box. Turbine..... A. C. E. Rateau et al
Sucker rod antifiction device..... 2 pats..... W. L. Black
Sucker rods, &c. Antifiction device for..... W. L. Black
Sucker rods and couplings. Antifiction device for..... W. L. Black
Supenders..... P. M. Way
Swing..... H. Geyer
Switch..... J. J. Smith
Switch actuator. Electric..... J. Y. Porter
Switchboard and supervisory signal circuit..... D. S. Hurlish
Switchboard socket..... H. R. Sargent
Syringe..... W. H. Humphrey
Telegraph. Printing..... O. L. Kleber
Telegraphy. Receiver for wireless..... A. de Castro
Telephone coin controlled apparatus..... E. G. Lewis
Telephone lock..... G. P. Moore
Tickets, cards, &c. Holder for..... A. A. Low
Tie bar..... B. Hafner
Tire repairing tool. Pneumatic..... W. M. Kimberlin
Tire setter..... I. M. Green
Tire. Vehicle steel spring..... J. A. Shearer
Tobacco pipe..... E. W. Zimmerman
Tobacco pipe..... E. T. Towgood
Toe clip..... F. J. & W. H. McMonies
Tool holder..... J. Hunter
Tooth crown..... C. P. Callaway
Toy. Flying..... L. B. Matteson et al
Transit. Miners' pocket..... J. H. Trerise
Transparencies, &c. Making primings (coat-ings) for..... F. Scherhag
Traveling bag. Telescopic..... M. Bukontz
Trolley..... N. Hublinger
Trucks and cars. Beam for car..... S. A. Crone
Truck. House moving..... E. W. Gragert
Truss..... E. J. O'Connor
Tube making machine..... F. C. Osborn
Turbine governor. Automatic..... A. C. E. Rateau
Twine holder..... H. B. Lehman
Typewriter..... 3 pats..... J. C. Lotterhaud
Typewriter line spacing mechanism..... C. W. Howell, Jr
Typewriter's chair..... F. Chichesier
Typewriting machine..... C. H. Shepard
Typewriting machine..... H. Jarvis et al
Valve..... J. H. Bickford
Valve controller. Throttle..... W. D. Willcox
Valve gear. Engine..... J. Vorraber
Valve gear. Steam engine..... P. Harris
Valve. Internal combustion engine..... C. O. Hedstrom
Valve. Steam engine..... E. S. Chapell
Vaporizer and burner..... N. L. Rigby
Vault. Burial..... D. W. Peckham
Vehicle controlling device. Motor..... W. A. Hatcher et al
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Vehicle draw bar and shaft support. Combined..... M. W. Seitzinger
Vehicle. Motor..... O. W. Kelly
Vehicle. Motor..... J. E. Millard
Vehicle storm shield attachment..... J. B. Russell, Jr
Vehicle wheel..... 3 pats..... S. B. Whiteside
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Vending apparatus. Collar button..... M. F. Price
Vending machine. Liquid..... T. F. Solon
Vessel. Domestic..... W. C. Jackson
Violin..... M. Kriwulka
Vise..... E. Zimmerman
Wagon box raising device..... J. C. Dwyer
Warp stop motion. Electrical..... V. Macku
Washboard..... W. J. Permar
Watch pendant. Swivel..... R. Wawrosch
Water purifier..... 2 pats..... G. M. Davidson
Watering can attachment..... F. H. Shaw
Weather strip..... S. P. Bricker
Weighing and price indicating apparatus..... F. Williams
Weighing machine. Automatic..... H. C. Bowles
Well boring drill..... A. C. Shuster
Wells. Sand reel for oil or artesian..... A. Benson
Whiffletree..... C. W. Threlkeld
Whiffletree..... W. H. Stansell
Winding machine cop holder..... R. Hill
Window..... C. E. Erickson et al
Window and blind fastener. Double..... W. M. F. Kelly

Window frame..... D. Zatzke
Woodworking machine..... A. J. Norris
Wrench..... C. M. Lambert
Wrench..... L. A. McLaurin
Wrench..... S. J. Petty
Wrench..... C. J. Coulter et al
Yarn for dyeing. Cop or package of..... S. W. Wardwell

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Lamp bracket or standard..... P. J. Handel
Lamp bracket or standard..... G. Lockert
Spoons, forks, &c. Handle for..... T. Heath
Stone. Cut..... S. Wood

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Acids. Making polyamidoanthraquinone sulfo-..... E. Hepp
Addressing and assorting newspapers, mag-azines, &c. Machine for..... L. A. Agnew
Adjusting compound wound generator..... 2 pats..... C. P. Steinmetz
Alcohol. Making wood..... W. S. Blandt et al
Animal trap..... H. Sargent
Automobile..... A. S. Krotz
Awnings. Means for hanging..... C. J. Graf
Axle support..... G. W. Kramer
Bag frame catch..... T. E. Grimm
Bag holder..... O. G. Nosker
Baie band fastening..... D. M. Campbell
Bandage. Suspensory..... H. C. Lovis
Batteries. Non-active metal for use in storage..... H. H. Lloyd
Beading and turning machine..... G. S. Hill
Bearing. Roller..... R. D. Camp
Bearing. Side..... J. C. Wands
Bed and commode. Invalid..... W. C. Feely
Bed. Sofa..... T. G. Weyer
Bedstead table attachment..... C. Swindell, Sr
Bedstead..... J. Aru
Bicycle driving mechanism..... M. Schmidt
Binder..... H. E. Dade
Bit..... E. A. Cowles
Blackboard trough..... T. R. Baker
Blotter holder..... L. W. Wilson
Blowpipe..... E. Fouché
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Boat. Swing..... J. White
Boiler..... C. R. Cowley et al
Book. Check..... F. Vaudeven
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Boot or shoe tree..... A. C. McKnight
Bottle..... V. D. White
Bottle holder..... A. Schneider
Bottle holding case..... F. W. Molitor
Bottle. Non refillable..... W. S. McCrea
Bottle. Non refillable..... T. J. F. Muller
Box..... H. F. Henning
Box fastener..... C. L. Mellinger
Box filling and closing machine. Paper..... C. de Quillfeldt
Box making machine..... J. W. Denmead
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Brake adjuster..... R. B. Paxton et al
Bread cutting machine..... C. J. Vann
Brick making machinery..... C. R. Monroe
Bridge. Collapsible or folding..... D. Doyeu
Broom or analogous instrument..... M. Young
Brush. Rotary..... F. G. Farnham
Bucket handle..... J. Schaffer
Bucket. Well..... C. P. Jackson
Buckle..... J. F. Molloy
Buffer. Hand..... O. L. Brainerd
Buffing wheel..... E. R. Burns
Burial apparatus..... C. W. Wellman
Button. Badge..... J. A. Doran
Camera attachment..... J. K. L. Thomsen
Can filling machine..... J. R. Brown
Can opener..... W. Maxwell
Cane and seat..... E. La Force
Capo tasto..... E. R. Kappeler
Car brake..... J. Runnoe
Car coupling..... F. S. Putnam
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Car fender..... E. Sherwood
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Car replacer..... G. I. Krieger
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Cars. Automatic latch for dump..... J. H. Hendy
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Cash carrier..... 3 pats..... W. L. Churchill
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Chain. Drive..... W. H. Hunt
Chaplet..... J. P. McCoy et al
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Chocolate cutter..... J. F. Wynkoop
Chuck. Drill and lathe..... O. M. Mowat
Churn..... A. C. Enoch
Clay press..... W. D. Frerichs
Clothes pins. Machine for scoring, riveting, and printing..... C. Carr
Clutch. Friction..... T. S. Casner
Clutch. Shaft and pulley..... A. C. Pessano
Coat hanger..... I. F. Baer
Coating composition. Insoluble..... J. A. Just
Cock. Ball..... D. W. Gorman
Cock. Plug..... L. J. Dordo et al
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Collar and necktie fastener..... W. Ferguson
Collar blanks, &c. Machine for folding..... C. H. Knapp
Collar blanks, &c. Machine for folding..... J. Maitland et al
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Coloring matter. Compound suitable for producing..... P. Julius et al
Comb..... J. A. Clinton
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Cork extractor..... W. T. Fox
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Cotton chopper..... A. R. Johnson
Cotton stalk cutter..... W. Qualis
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Current motors. Starting alternating..... 2 pats..... T. J. Johnston
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Cycle driving gear. Motor..... D. Macdonald
Cycle. Motor..... F. Thournot
Damper mechanism..... F. G. Cooper
Dental chair..... A. W. Browne
Dental engine..... F. Hurlbut
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Dental matrix crown..... I. H. Alexander
Dental tool holder..... C. A. Lundberg
Dentistry..... G. G. Martin
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Draft gear. Friction..... H. C. Buloup
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Drum. Heating..... W. J. Burton
Dumping device..... C. W. Howbert
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Edge. Straight..... W. Paschall
Educational appliance..... J. Flindall
Egg filler..... C. E. Staats
Electric conduit..... A. M. Lougee
Electric conduits. Making..... A. M. Lougee
Electric machines. Maintaining synchronous rotation of dynamo..... E. W. Mix
Electric machines. Operating dynamo..... F. H. Jeannin
Electric meter..... J. Harris
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Electric time switch..... M. Rush
Electric waveforms. Recording..... E. J. Murphy
Electrical distribution system..... C. P. Steinmetz
Electromagnetic brake..... W. T. Pember
Electromagnetic tool..... R. R. Nicely
Elevator hatchways. Safety doorway for..... J. H. Johnson
Emergency brake..... A. L. von Steuben
End gate..... J. F. White
Endless carrier..... T. X. Jones
Engine..... J. P. Magney
Engine brake. Traction..... E. Doerschlen
Engine coupling. Traction..... J. W. Buller
Engine sparking mechanism. Gas or gasoline..... J. E. Bean (by judicial change of name now E. B. Parkhurst.)
Engines. Exhaust pipe muffler for gas or other..... J. L. & C. J. Tobias
Envelop..... H. A. Graham
Eyeglasses..... (reissue)..... R. B. Finch
Eyelet..... F. Quarmby
Faucet holder and solder retainer. Combined..... J. G. Porch
Faucet. Hot or cold water..... P. E. Pierce et al
Feed regulator..... G. Hoepner
Fence making machine..... W. C. Kincaid
Fiber. Treating vegetable..... C. T. Lee
File. Document..... F. Trambly
File wrapper..... F. L. Danforth
Filter and cooler. Combined..... J. E. Bimm
Filter. Coffee..... R. Aubry
Filter. Oil..... J. D. Edwards
Fire alarm. Automatic..... F. Bernardin
Firearm. Magazine..... S. H. Barton
Fire door lock..... G. Albrecht
Fireproof grain bin..... E. V. Johnson
Fireproof structure. Prismatic..... F. L. O. Wadsworth
Fish hook..... W. H. Jacoby
Fish nets. Illuminating buoy for..... W. L. Uhlenhart
Fishing reel..... J. H. Adams
Fishing tackle spoon carrier..... J. J. Hildebrandt
Flue cutter. Adjustable..... W. H. Kaufman
Flushing device..... W. Scott
Fly trap..... H. A. Bierley
Food. Cereal..... H. D. Winton
Fruit assorting table..... C. D. Nelson
Fuel briquet..... J. Simons
Furnace..... G. W. Meacher
Furnace doors. Device for connecting..... M. Cummings
Fuse carrier..... H. R. Sargent
Gage..... J. A. Traut
Game..... C. M. Atkins
Game register..... E. J. Wells
Games. Counter for pinochle or similar..... L. V. Johnson
Garment clasp or hose supporter..... J. Stanley
Garment hanger..... M. A. Willer
Garment supporter..... L. M. Jones
Gas burner..... W. F. Keiser
Gas burner of Bunsen type for illuminating purposes and for heating..... P. Lamure et al
Gas engine..... J. McCoy
Gas generator. Acetylene..... F. L. Irish
Gas generator. Acetylene..... T. H. Duncombe
Gas generator. Acetylene..... H. & H. H. Healey
Gas generator. Acetylene..... G. G. Smith
Gas. Means for storing and distributing..... G. G. Smith
Gas pressure regulator..... F. J. Root
Gas regulator..... G. H. Gregory
Gas tubing..... L. P. Dodge
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Glass articles. Apparatus for finishing..... G. W. Blair
Glass tile press..... C. P. Lawshe
Globe supporting bracket..... V. Lansingh
Gold separator..... F. M. Johnson
Golf game. Indoor..... H. H. Taylor
Governor..... J. A. Lightipe
Grain cleaner and separator..... J. C. Benson
Grain drill..... A. N. Norris
Grain elevator and dump..... H. A. Burgess
Grain. Steeping..... W. P. Rice
Grease cup..... H. C. Wiuspear
Grinding, polishing, or buffing machine..... C. Werra
Ground detector..... W. H. Pratt
Gun mount..... F. H. Schofield
Harrow..... H. H. Larsen
Harvester. Grain binding..... W. N. Whitely
Hat brim flanging machine..... A. B. Waring
Heater mounting. Electric..... E. E. Gold
Hide working machine..... N. Leidgen
Hinge..... H. A. Paquette
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Hoisting engine dogs. Device for operating..... P. Olsner
Horse apron..... J. Sullivan
Horse from their stalls in case of fire. Device for detaching and removing..... W. R. W., H. E. M., & D. J. L. Steiner
Horseshoe..... G. D. Nash
Horseshoe blanks, &c., from ductile metal. Manufacture of..... C. Holt
Horseshoe calk..... C. D. Meitzler
Hose pipe connection..... G. S. Lee
Hose supporter..... A. H. Cohn
Hose supporter hook..... M. B. Hammond
Hot air furnace..... J. Evans
Hot water bag stopper..... E. E. Menges
Hydrocarbon burner..... F. A. Reynolds
Igniting device. Electrical..... C. A. Holdridge
Incandescent gas mantles. Manufacturing..... J. T. Robin
Incandescent mantles. Machine for producing..... J. T. Robin
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Indoxyl and making same. Substituted..... H. S. A. Holt
Ink receptacle..... T. Waring
Ink well. Suspended..... M. Behrman
Insulating or protective compounds. Manu-facture of..... C. L. V. Zimmer
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Ironing machine..... D. H. Benjamin
Ironing table..... I. M. King
Jig for mineral or ore washing..... C. J. Hodge
Joining device..... E. H. Sheldon
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Label gumming machine..... J. G. & M. O. Rehffuss et al
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Lamp burner attachment..... A. L. Higgins
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Lamp. Regenerative gas..... T. S. Leese
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Lead. Making white..... W. H. Rowley
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Lock..... O. Stoddard
Lock bar pipe..... T. A. Gillespie
Locomotive..... A. P. Dodge
Locomotive. Electric..... E. C. Lindsay
Low water alarm..... J. A. Brockhuis
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Mail bag delivering device..... J. Swihart
Mail box door register..... H. S. Mills
Mail matter. Metallic device for fastening up..... G. T. Shilton
Match safe..... H. T. Randle
Matrix making machine..... G. B. Shepard
Mattress sterilizer..... W. H. Busser
Measuring instrument connection..... J. E. Woodbridge
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Measuring the lengths of fabrics. Apparatus for..... F. C. Stephan
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Medical appliance. Electromagnetic..... F. H. Voltery
Medicinal vapor or liquid from the smoke of green wood. Apparatus for producing..... H. E. Smith
Metal plate. Treating..... J. Howell et al
Metal strip folding machine..... E. M. Cobb
Mine trap door..... J. Wack
Mine ventilating apparatus..... C. Kuderer
Miter box..... G. M. Green
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Molding machine..... J. Anderson
Monkey wrench..... A. C. McFarland
Motion transmitting device..... G. G. Beitzel
Motor control..... J. D. Ihlder
Motors from distant points. Controlling..... N. C. Bassett
Moving stand or figure..... H. E. Hupton
Music holder and turner..... J. F. Black
Musical instrument. Automatic..... G. A. Brachhausen
Musical instrument head piece. Stringed..... J. Brandt
Name plate or printing machine..... J. F. Blake
Neckwear holder..... W. H. Hart, Jr
Newspaper folding, wrapping, addressing, and assorting machine..... L. A. Agnew
Oar lock. Folding..... J. M. Birtele
Obstetrical tractor..... E. D. St. Cyr
Oil burner..... W. E. Chandler
Oil burner. Crude..... L. S. Flatau
Oil heating and heat regulating device..... G. Porter
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Organ..... H. C. Fletcher
Packing. Piston rod..... A. B. Kay
Paper bag holder..... F. M. Thorpe
Paper conduit..... L. P. Dodge
Peat collecting machine..... W. A. Milne
Peat drier..... W. A. Milne
Peat fuel. Manufactured..... R. A. Kellond
Pen or pencil holder..... J. L. Mullins
Perforating machine..... E. B. Stimpson
Phonograms. Duplicating..... T. A. Edison
Phonograph..... G. A. Moore
Phonographic record..... G. A. Moore
Piano damper action..... C. Otto
Piano tuning pin..... H. G. Osterberg
Picture frame. Combination..... F. L. & W. G. Stiff
Picture frames. Machine for manufacturing..... C. E. Sandstrom
Pictures. Apparatus for exhibiting or viewing animated..... E. B. Koopman
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Piles. Placing..... C. Soosmith
Pipe T-coupling..... J. J. Reilly
Planter. Corn..... L. P. Graham
Planter. Corn..... E. M. Heylman
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Plow..... C. S. Ruef et al
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Preserving cereal foods..... H. D. Winton

Preserving cereals.....H. D. Winton
Pressure regulator.....C. F. Sperry
Printing press perforator.....J. Kane
Projectile. Hollow.....A. W. Erdman
Propeller.....S. Irwin
Proteids from non-nitrogenous bodies. Separating.....J. Carstairs
Punch and time stamp. Combined.....E. G. Connette
Punch. Check.....G. M. Merritt
Punching bag supporting device.....G. S. Maxwell
Putty knife and pot hanger. Combined.....C. B. Mansbach
Pyroxylin article.....J. H. Stevens et al
Pyroxylin articles. Making.....J. H. Stevens et al
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Rail joint.....J. A. Bridge
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Railway danger signal.....J. Frysinger
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Rectifier.....2 pats.....H. W. Buck
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Rein holder.....F. Matthews
Retinoscope.....S. A. Rhodes
Rifle.....J. B. Thorncroft
Roof board joint.....W. S. Wickham
Roof clamp or bracket.....I. E. Clum
Rotary engine.....J. C. Hagerty
Rotary engine.....W. I. Phifer
Rotary engine.....F. C. Jewell
Rotary engine.....M. D. Kalbach
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Sand scoop and elevator.....I. Bush
Saw guard.....W. B. Bennett
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Scale. Computing spring.....W. C. Whitney
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Secondary battery.....R. Welford
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Sewer cleaner.....L. Dubois
Sewing machine automatic stop mechanism. Buttonhole.....2 pats.....P. Fabisch
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Shade cloth trimmer.....F. McDaniels
Shaft coupling.....H. B. Murdoch
Shafting set collar.....C. W. Levalley
Sheep shears.....J. Pomeroy
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Shepherd's crook.....F. Bius
Shoe case.....E. C. Thurnau
Skirt attachment.....G. H. L. Clark
Sleeping bag.....I. W. Morton
Sleeve protector.....E. Peterson
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Smoke consumer.....C. E. Padgett et al
Solidifying and excavating the soil and constructing tunnels.....C. SooySmith
Sounding board.....S. W. Clark
Spanner attachment.....P. Rayson
Spinning machine.....J. Brown
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Stalk cutter.....J. H. Cotten
Stamp affixing machine.....C. J. Fancher
Station indicator.....J. E. Smith
Steam boiler.....L. Lewicki
Steam engine.....W. L. Silvey
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Steam generating furnace.....J. L. Giroux
Steam generator for hydrocarbon burners.....G. W. Arper
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Steam strap.....W. T. Powers
Steering and maneuvering wheel for vessels.....S. W. Coffin
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Stocking supporter.....D. H. Warner
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Stuffing box. Yielding.....C. Endrueit
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Tanning and leaching apparatus.....C. M. Walter
Tanning hides, &c.....O. P. Amend
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Thill coupling.....L. J. Dillon
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Threshing machine self-feeder.....A. Herl
Tie structure.....T. J. Middlebrooks
Time lock.....J. Gonorovsky
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Tobacco pipe.....J. W. Rickert
Tobacco pipe.....W. Herrick
Tobacco stemming machine.....A. J. Bush
Tobacco tying machine.....J. W. Clark et al
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Tool. Combination.....J. O. Hess
Tooth crown burnisher.....J. D. Kinsley
Top. Spinning.....E. B. Smith
Torpedo boat.....F. W. Brady
Toy and puzzle.....L. E. De Marais
Toy. Ball and bat.....F. M. Lawrence
Transformer.....W. S. Moody
Transmission mechanism.....H. C. Baase
Tree extracting, transporting, and replanting apparatus.....M. Ryder
Trigger mechanism. Single.....M. A. Tighe
Truck bolster. Car.....2 pats.....J. C. Wands
Truck side frame.....C. S. Shallenberger
Trunk. Hat sample.....W. C. Richards
Trunk tray holder.....O. Rangnow
Truss. Adjustable pliable.....W. Payne
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Tumbling machine.....H. E. Barton
Tunnel.....C. SooySmith
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Tunnels, shafts, &c. Building.....C. SooySmith
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Turbine holder.....D. E. A. Lundquist
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Valve. Globe.....J. Powell
Valve. Railway tank.....C. Ernst
Valve. Stop and automatic check.....J. C. McClelland
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Vaporizer. Hydrocarbon burner.....G. D. Scott
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Vehicle fender.....E. Sherwood
Vehicle wheel.....G. S. Lee
Vending machine.....M. B. Mills
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Violin bowing guide.....H. S. Strauss et al
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Vise. Folding.....J. W. Gaede
Vise. Pipe.....T. J. Yates
Voltaic cell.....H. B. Taylor
Voting machine.....A. J. Gillespie
Wagon and baby walker. Combined.....J. B. Harstone
Wagon box. Dumping.....E. P. Burnham
Wagon brake. Automatic.....A. J. Snyder
Walls. Mold for concrete.....H. A. Taylor
Warp balling machine.....E. T. Garsed
Washing machine.....F. J. & M. C. Coon
Washing machine.....C. H. Sword
Washstand, basin, sink, &c.....J. H. Danver
Water heating and distributing system.....G. C. Savage
Water wheel of the parallel flow type. Turbine.....J. A. Thain
Weather strip.....J. A. Thain
Welding die. Link.....W. N. Gourley
Well tube lifter.....J. Neumeier
Well tubing strainer.....J. M. Ware
Wells. Rod and tube elevating and pumping apparatus for oil.....W. J. Wright
Whiffletree clip.....C. Fenton
Wind motor.....H. Grist
Window.....O. A. Essig
Window frame and sash.....G. Schwing
Wire or fence stretching machine.....J. W. Suedeker et al
Wire weaving machine.....W. J. Wright
Wrench.....I. De Ford
Wrench.....J. Pack
Wrench and can opener. Combined.....J. Cooper
Yarns. Machine for the manufacture of lustrous.....J. Stoerk et al
Yoke. Breachy cattle.....J. E. Horn

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Brushes, &c. Back for.....W. F. Marshall
Fabric.....C. E. Howe
Floor or wall covering.....C. J. Bogert
Statuette.....L. V. Aronson
Stove. Heating.....C. S. Prizer
Vehicle body.....E. H. Phipps
Watch fob.....W. J. Adler

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Acids or acid salts. Clearing fluids containing free.....H. Kaserer
Air brake.....C. W. Cawley, Jr.
Air compressing device.....J. H. Bullard
Ampere hour meter.....W. A. Sherlock
Amusement apparatus.....E. C. Boyce
Anchor.....J. Wick
Ankle protector and arch support. Combined.....B. Nathan
Antimony. Producing metallic.....T. C. Sanderson
Apron. Storm.....J. C. Mendenhall
Automatic elevator or hoist.....J. Sewell
Axle.....L. G. Nilson
Awning frame.....W. E. Weis
Back band making machine.....W. W. McBath
Back pedaling brake.....W. H. Brewster
Balance wheel.....J. Waldron
Baling press.....C. Orman
Ball lifting device.....P. R. Oliver
Ballast unloader.....G. W. King
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Bandage. Supporting.....L. R. Miller et al
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Bedstead.....J. I. McDonough
Bedstead.....W. A. Reddick
Bell. Vehicle.....J. D. Caldwell
Bicycle.....G. H. Williams
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Blowing engine.....C. Robinson
Boat.....S. S. York
Boat lowering apparatus. Life.....A. Kersul
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Bolt cutter. Stay.....C. J. Carney et al
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Bottle. Non-refillable.....S. McQuaig
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Brake beam.....C. V. Marquart
Brake shoe.....W. D. Sargent
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Bridges. Construction of.....H. Prinzhorn
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Brush holder for motors, &c.....B. A. Stowe
Brush holder support.....H. A. Balcome
Brush or broom holder. Adjustable.....A. Wurm
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Bucket.....G. H. Hulett
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Camera finder.....J. D. Garfield
Camera focusing device.....F. A. Brownell
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Cannon. Breech loading.....C. H. Griffith
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Cap. Bathing.....F. G. Littell
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Carton machine.....W. E. Reuling
Casket shrine.....E. Stumpf
Caster.....E. C. Baynes
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Chair foot rest.....J. C. Garrett
Checkrein.....G. McElroy
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Clock striking mechanism.....A. C. Schuman
Clothes drier.....F. S. MacDougall
Clothes line prop.....S. Day
Clover huller self feeder.....C. Clark
Coal tippie.....F. W. Willis
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Coin controlled apparatus.....S. L. Long
Coke oven.....H. Kennedy
Collars. Making.....W. W. Searle
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Composition of matter.....O. Russell
Concentrator.....A. Ten Winkel
Condenser.....F. Lamplough
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Cooling apparatus.....J. W. Billings
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Cork cutting and tapering machine.....A. Fabre
Corn shock mover.....A. G. Keck
Cotton chopper.....T. N. Mayfield
Cracker. Filamentous.....H. D. Perky
Cuff holder.....H. C. Frank
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Curtain fixture.....H. E. Keeler
Curtain stretching frame.....J. C. Wagner
Cycle driving gear.....J. B. Forster
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Electric interrupter.....L. G. Nilson
Electric machine. Dynamo.....2 pats.....A. Churchward
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Exhaust mechanism.....W. Hood
Explosive engine.....2 pats.....J. A. Osterberg
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Feeding steam generators. Apparatus for forcing liquids particularly applicable for.....C. Caille
Fence ratchet or tightener. Wire.....C. A. Willmarth
Fence stretcher. Wire.....I. M. Warner
Fencing rod. Wire.....A. T. de Barry
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Filter and filtering system.....R. J. Goode
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Fire extinguisher. Chemical.....F. J. Brischar
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Fish bait.....B. F. McCurdy

Fishing reel.....A. E. Hall
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Floor or sidewalk cleaner.....F. W. Richter
Fluid flow controlling device.....J. W. Nethery
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 Scoop. Wheeled..... J. J. Gyllenborg
 Seal lock..... W. H. Preston
 Seasickness. Device for preventing..... W. Schmidt
 Seed dropper and distributor. Combination..... W. W. Pickern
 Sewing machine. Buttonhole..... G. S. Hill
 Sewing machine cabinet..... E. E. Manning
 Sewing machine. Carpet..... J. H. Hood
 Sewing machine thread controlling device..... E. B. Allen
 Shade roller..... G. Mathis
 Shade roller cap..... W. D. Jones
 Shapers, &c. Counterbalance for traveling head..... M. & H. E. Morton
 Shears..... J. J. Broman
 Shears..... E. D. Woods
 Shingle edging machine..... J. D. Caldwell
 Ship's-course indicator..... W. J. Condon
 Shirt and collar..... W. B. Eichholtz
 Signaling device..... C. Kitching
 Sink bar holder..... E. Tompkins

Signs. Switchboard for illuminating electric light..... M. Norden
 Skirt holder..... L. C. Edmunds
 Sled. Logging..... W. E. Organ
 Small arms..... S. J. Evans
 Snap hook..... C. F. Keynolds
 Soldering iron. Can cap..... W. Morse
 Sound box..... W. V. P. Bradley
 Sowing apparatus..... G. K. Spitzenberg
 Speed. Indicating..... J. H. Hudson
 Spike puller..... W. L. Harris
 Spinning spindle..... G. A. Draper
 Spring clasp..... C. Kellner
 Stacker. Pneumatic..... C. Bradford
 Stacker. Pneumatic..... W. McKone
 Steam boiler..... 2 pats..... W. A. Woodson
 Steel tie and rail fastener..... J. R. McClure
 Steering apparatus. Boat..... C. Rogers
 Sterilizer. Liquid or fluid..... I. E. Schoch
 Stone cutting machine..... H. H. Wetmore
 Stool. Portable..... W. H. Herbert
 Stopper..... W. G. Spire
 Stopper puller..... E. M. Wilcox
 Stove..... R. Stander
 Strainer..... R. O. Bennett
 Stretchers. Portable stand for supporting and carrying..... H. C. Hall
 Sugar loaves. Producing..... H. Passburg
 Suspenders..... H. G. Macwilliam
 Switch lever..... J. Breunau
 Switch stand..... E. N. Strom
 Switch throwing device..... J. O. McCann
 Syringe. Hypodermic..... H. J. Gill
 Tag. Shipping..... O. A. Stentermann
 Talking machine horns and sound boxes. Connector for..... L. P. Valiquet
 Tank heater..... D. Wedean
 Taps. Construction of high pressure water..... W. Bradley
 Tassel festooning..... W. B. Shuck
 Telegraphy. Wireless..... H. Shoemaker
 Telephone..... E. E. Yaxley
 Telephone system..... C. G. Burke
 Tennis bat..... W. E. Bussey
 Tennis set holder. Table..... O. Haskell
 Textile goods. Making colored designs on..... A. & H. Barraclough
 Thermo electric generator..... I. Kitsee
 Thill coupling..... L. P. Prudeaux
 Threshing machine. Grain..... F. W. Billings
 Tile floor construction..... C. F. Bue te
 Tile. Illuminating..... L. J. W. Biru
 Tile laying machine..... A. Schopf
 Tire for vehicle wheels. Spring..... J. W. Mooring
 Tire. Pneumatic..... G. H. Clark
 Tires. Device for constructing and curing continuous rubber..... M. A. Boylan
 Tobacco stripping machine..... J. A. Hutcheson
 Toilet article..... H. E. Harlan
 Tool. Compound..... J. Y. Shallenberger
 Torpedoes. Submerged broadside apparatus for discharging..... G. Hoyos
 Tramway plate..... R. Stone
 Transformer..... A. Churchward
 Transformer..... W. S. Moody
 Transmitting the positions of movable pointers. Apparatus for..... O. Widmann
 Tripod..... H. G. Ostermann
 Tripod support..... F. B. Seitz
 Trolley pole..... T. C. Buder
 Trolley. Self oiling..... J. R. Stanley
 Trolleys. Automatic releasing device for safety..... A. C. Wolfe
 Truck. Elevating..... E. L. & W. H. Cadwell
 Truck. Hand..... W. G. Tower
 Truck side frame..... C. T. Westlake
 Tubes. Coiling chamber for coiling metal strips into..... T. A. Judge
 Tunnel roof. Sectional ventilating..... E. H. Call
 Turbine..... J. Procter
 Turbine governor. Elastic fluid..... D. D. Book
 Turbine. Steam..... C. Weichelt
 Turbine. Steam or vapor..... H. T. Lees
 Turbine. Reversing..... G. C. Henning
 Typewriter..... O. Schultz
 Typewriter type bar aligner..... J. Alexander
 Typewriter type bar mechanism..... G. H. Smith
 Typewriting machine..... W. P. Quentell
 Valve. Air compressor..... F. M. Metcalf
 Valve attachment. Steam cylinder..... W. B. Burrows
 Valve. Compressor discharge..... F. W. Gordon
 Valve for internal combustion motors. Exhaust..... W. J. Crossley et al
 Valve for ships. Air..... T. S. Bailey
 Valve. Gate..... A. W. Cash
 Valve. Trap..... B. Menard
 Vapor burner..... J. H. Bullard
 Vehicle resilient spring. Wheeled..... J. F. Pope
 Vehicle spring hanger..... H. K. Pell
 Vehicle top front..... J. B. McMullen
 Vehicle wheel. Metallic..... T. Midgley
 Velocipede..... A. M. Allen
 Vent hole closure..... W. R. Arnold
 Vessel. Metallic..... J. E. Case et al
 Vessels. Detachable deck for marine..... J. W. Powell
 Vise. Pipe..... J. & J. Bryant
 Wagon. Dumping..... J. Guild
 Washing machine..... B. W. Kyle et al
 Washing machine..... W. H. Hayden
 Water supplies. System of purifying municipal..... P. J. A. Maignen
 Wattmeter..... V. Arcioni
 Wedge joint..... E. Pfeil et al
 Well drilling machine..... R. B. Moore
 Wheel..... H. D. Lefebvre
 Whiffletree hook..... R. A. Dils
 Wick snuffing device. Lamp..... M. Cameron
 Windmill..... J. R. Tinney
 Windmill..... C. Wall
 Windows. Means for reversing..... M. Lezius
 Wire mill automatic stop mechanism..... H. H. White
 Wire splicing machine..... J. Barron
 Wire weaving machine..... W. J. Wright
 Wood impregnating apparatus..... T. Giussani
 Wood scraper..... N. Galipeau
 Woodworking machine..... R. W. McDaniel
 Yarn. Glossing..... J. H. Ashwell
 Yoke. Neck..... S. J. McDonald

DESIGNS.

Bottle..... C. C. Bonnett
 Burial caskets. Metallic rim for face glasses of..... J. M. McComas
 Cabinet. Barber's..... G. M. Moore
 Spoons, &c. Handle for..... C. Osborne
 Stone. Cut..... S. Wood

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MECHANICAL PATENTS.

Acids of niter cake. Recovering free and combined..... L. Cheeseman, Sr
 Acids of the fatty acid series. Making..... H. von Hochstetter
 Adding machine..... F. E. Coffeen
 Adjustable seat..... D. M. Haverly et al
 Air brake triple cylinders. Truing device for..... E. M. Barnes
 Air or vacuum motor..... M. Arndt
 Air tight can and means for dispensing liquid therefrom..... C. Marks
 Amusement apparatus..... F. H. Lippincott
 Anchor. Land..... T. E. Hallett
 Animal catcher..... C. H. Geniaux
 Animal trap..... H. J. Gaedike
 Automobiles, &c. Steering device for..... W. L. Mead
 Awning..... A. K. Johnston et al
 Bag holder..... B. O. Branch
 Bag machine..... J. V. Matieson
 Ballast unloader..... G. W. King
 Band cutter and feeder..... J. Beisch
 Basin cover and sewer inlet. Catch..... F. H. Jackson et al
 Battery depolarizer..... C. E. Lockwood et al
 Bearing. Ball..... J. E. Y. Rochester
 Bearing. Centrifugal machine..... H. F. Cline
 Bearing for wheels. Oilless..... H. C. Tazewell
 Bearings, &c. Collar for shaft..... A. Riebe
 Bed couch..... J. Hoey
 Bed. Folding..... L. E. Olney
 Bed. Folding..... J. A. Lesperance
 Beet digging machine..... E. & A. Pruvot
 Bicycle frame..... H. W. Freed
 Bicycle saddle cloth..... F. J. Schurmann
 Binder knotting device. Automatic..... F. A. Ryther
 Binocular glass..... W. R. Warner et al
 Body brace..... J. U. Adams
 Boiler flue rattler..... H. O. Westmark
 Bottle closure..... L. D. Parks
 Bottle filler. Siphon..... J. K. Turajski
 Bottle filling and stoppering machine..... R. G. Nash
 Bottle. Non refillable..... E. M. de Valdes
 Bottle. Nursing..... A. Blatin
 Bottle. Nursing..... L. Anderson
 Box..... M. A. Osburn
 Braiding carrier tension (reissue)..... J. A. Turner
 Bromin from brine. Extracting..... H. H. Dow
 Brush. Scrubbing..... J. B. Martin
 Buckle..... N. I. Hecht
 Buckle. Harness..... B. F. George
 Buckle or frame..... H. J. Gaisman
 Burglar alarm or door signal (reissue)..... W. R. Edelen
 Bustle..... H. H. Taylor
 Button setting machine..... E. B. Stimpson
 Cabinet. Kitchen..... G. W. Harris
 Can closure. Milk..... J. C. Howell
 Can for bakery or similar products..... M. J. Nash
 Cane trash gatherer, cutter, and spreader. Sugar..... H. B. Gray
 Canopy..... J. M. & E. E. Truscott
 Cap closure. Sheet metal..... E. Hoffman
 Car brake..... E. Posson
 Car fender..... W. B. Collins
 Car. Non telescoping..... G. E. Dickson
 Car safety attachment..... B. Long
 Car starter..... J. R. Trott et al
 Car. Tank..... C. L. Rogers et al
 Car window roller screen..... F. A. Carpenter
 Carbureter..... C. I. Tenney
 Carbureter. Explosive motor..... E. L. P. Mors
 Card serving machine. Automatic..... G. A. Armstrong
 Cash and parcel carrier..... N. Leblanc
 Casket lid..... N. Rappleyea et al
 Caster..... M. G. Daniels
 Cells, vaults, &c. Lining for..... D. F. Youngblood
 Celluloid. Mounting stones, &c., in..... M. H. Brown
 Cement. Casting..... W. Perry
 Chair seat surfacing machine..... C. A. Stark
 Champagne freezer..... J. Trafford
 Change feed mechanism..... J. Edgar
 Chenille cloth cutting machine..... P. McDonald
 Chute and automatically opening or closing door for air tight chambers..... S. P. Stevenson
 Cigar or cigarette holder. Paper rolled..... H. Heiser
 Cigars. Machine for preparing leaf tobacco for manufacture into..... P. H. Erthelier
 Cigarette paper. Applying cork strips to..... G. Nast
 Clamp for ropes, straps, chains, &c..... L. M. Chapman
 Clipper..... R. F. Werk
 Clutch or coupling. Friction..... H. D. Loria
 Coin depositing apparatus..... G. F. Lehrke
 Coke ovens, &c. Wall construction for..... H. Koppers
 Collar foundation..... A. A. Dieter
 Column for architectural purposes. Sectional..... F. A. Spencer
 Commutator oil guard..... W. F. Dawson
 Compasses. Extension..... B. E. Gove
 Composition of matter..... J. Poliakoff
 Condenser for steam propelled cars or vehicles. Air..... E. R. Bridson et al
 Converter..... G. C. Carson
 Converter. Continuous..... G. C. Carson
 Converters. Starting rotary..... W. B. Potter
 Conveyance. Passenger and freight..... J. H. Marsh
 Conveyor..... M. Bradford
 Conveyor..... B. H. Alvey
 Conveyor apparatus..... M. Bradford
 Conveyor system..... H. W. Blaisdell
 Conveyers. Reversing cam for endless..... P. B. Clarke
 Cooler..... M. A. Simmons
 Copying bath..... J. M. Nicholas
 Corset and gown stay..... D. P. McKenney
 Cot. Folding..... I. Stanley
 Cotton chopper and cultivator. Combined..... L. A. Miller
 Couch rolls. Guard board and cleaner for..... H. C. Willmott et al
 Coupling..... E. Vogel
 Cream separator..... A. Klay et al
 Creamatory (reissue)..... F. L. Decarie
 Culinary appliance..... S. Worley et al

Culinary vessel..... F. A. Johnson et al
 Cultivation apparatus. Steam..... R. H. Fowler et al
 Cultivator..... J. E. Gamalielson
 Cultivator..... J. O. Lawrence
 Cultivator. Three row disk..... W. W. Bott
 Cultivator tooth. Adjustable..... F. G. Hoag
 Current motors. Controlling alternating..... 2 pats..... C. P. Steinmetz
 Currents in alternating systems. Increasing the number of phases of..... A. G. Davis
 Currents. Producing multiphase currents from single phase..... A. G. Davis
 Curtain poles, &c. Means for connecting ornamental heads or knobs to..... F. K. Phillips
 Dental engine handpiece..... A. W. Schramm et al
 Dental furnace. Electrical..... A. M. Hewett et al
 Derrick for loading or unloading vessels..... N. E. Porter
 Derrick for vessels. Coal..... O. Eliassen et al
 Detector bar clip..... J. P. Coeman
 Deionator..... J. W. Fowler
 Diseases by vacuum and air pressure. Apparatus for treating..... R. Watson
 Disk cutter..... J. Brooks
 Display box..... H. Wertz
 Display tray and case..... E. F. Winters
 Distilling apparatus. Liquor..... J. C. Bertsch
 Door check..... C. F. Sullivan
 Draft regulating mechanism. Automatic..... I. P. Taggart
 Drying humid material. Apparatus for..... A. Huillard
 Dye and making same. Orange brown sulfur..... A. Weiuberg et al
 Electric currents. Increasing the number of phases of..... A. G. Davis
 Electric cut out..... H. N. Potter
 Electric distribution system..... H. W. Buck
 Electric machine regulating device. Dynamo..... C. W. Kragh
 Electric switch..... N. Marshall
 Electric switches or circuit breakers. Tripping..... J. D. Hilliard, Jr
 Electrical distribution. Phase modifier and system of..... A. G. Davis
 Electrical distribution system..... 2 pats..... A. G. Davis
 Electrical receptacle..... 2 pats..... P. H. Fielding
 Electrode for arc lamps. Composite..... A. Blondel
 Electrolytic cell..... M. C. Rypinski
 Electromagnet. Polarized..... L. Cerebotani
 Elevator operating mechanism..... H. M. Churchill et al
 Elevator or storage bin construction..... W. S. Cleveland et al
 Elevator well door..... W. A. Cross
 Embroidering machine..... A. & J. B. Bastie
 Engine reversing gear. Steam..... L. D. Epperson
 Envelop..... W. S. Harrison
 Evaporating apparatus. Vacuum..... C. Orway
 Exerciser..... M. Duffner
 Exercising apparatus for straightening the legs..... F. Langel
 Explosive engine..... F. Lagoutte
 Eyelet..... E. Kempshall
 Fastening inserting machine..... E. T. Freeman
 Faucet for dispensing beverages and filling siphon bottles..... J. F. Doyle
 Feed regulator. Boiler..... O. E. & E. Clark
 Feeder. Boiler..... E. J. Wood
 Feeder. Stock..... J. P. Bowmaker
 Fence post brace..... E. Love
 Fence post. Metal..... T. Beerbower
 Fence posts. Machine for molding concrete..... C. H. Hutchings
 Fence. Wire..... J. J. Harris
 Fence wire tightener..... C. W. Hoagland
 Fertilizer distributor..... E. C. Smith
 Fiber machines. Catter head for wood..... I. W. Hoover
 Filter press..... F. S. Guy
 Fireplace..... M. J. Robbins
 Fireplace fixture..... W. A. Posey
 Fireproof window..... L. D. Biersach
 Folding box..... E. L. Brown
 Folding chair..... A. J. Randall et al
 Frame joint..... J. H. Sager et al
 Furnace bottom and making and repairing same..... J. Dunford
 Furniture adjusting device..... F. L. Harris
 Garment fastening..... M. M. McGrath
 Garment support..... B. H. Scott
 Gas burner. Safety..... L. F. Ducker
 Gas burner safety by pass device..... J. Vaillant
 Gas check. Adjustable..... M. D. Compton
 Gas generator. Acetylene..... E. R. Angell
 Gas generator. Acetylene..... N. A. Renstrom
 Gas generator. Acetylene..... 2 pats..... F. M. Moore
 Gas generator. Acetylene..... H. Kinsey et al
 Gas regulator..... G. A. Brachhausen
 Gear. Changeable speed..... A. C. Lindgren
 Gear for motor cars, tools, &c. Variable speed and reversing..... J. E. Mennessier
 Glass cutter's board..... A. Whitehouse
 Glass melting and mold charging apparatus..... H. H. Bridgewater et al
 Glassware. Machine for making hollow..... G. C. Pyle
 Glazier's point..... T. N. Parker
 Grading and scraping machine. Road..... W. S. Paget
 Grain elevator..... T. J. Levy et al
 Grass or grain cutter..... T. F. McDonald
 Grip wrench. Automatic..... J. R. Cogan
 Hair pin..... T. C. Allen
 Hammer. Pneumatic..... J. T. McGrath
 Hammock frame or support..... W. Augustus
 Hammock support..... D. F. Youngblood
 Handling material in bulk. Apparatus for..... P. B. Clarke
 Harness connection for neck yokes..... J. F. Bline
 Harrow. Rotary..... H. F. Jurs
 Harvester cord carrier. Self binding..... J. A. Sharp
 Hat fastener..... G. E. Lacy
 Hay carrier. Elevated..... S. Jacobs
 Heating apparatus..... C. E. Kennedy et al
 High potential switch..... C. C. Badeau
 Hinge. Friction..... V. C. Luppert
 Hod..... J. Dorey
 Hoisting and conveying apparatus..... W. McIntosh
 Horseshoe..... J. F. Kerns
 Hose coupling..... J. F. Sargent, Jr
 Hose coupling..... H. Grubbs
 Hose. Metallic spiral..... E. Witzemann

Hose protector. Railway track. H. H. Arnold
Hose rack. C. Wright
Hose supporter hook. M. B. Hammond
Hot air and gas engine. Combination 2 pats. C. A. Anderson et al
Hot water heater. O. Lobel
Ice cream disher. W. J. Bolland
Ice making machine. R. F. Learned
Iced goods. Drier for bakery or similar. F. L. Wetzel
Icing frame truck. F. L. Wetzel
Icing for coating of bakery products. Machine for facilitating the. 2 pats. F. L. Wetzel
Incubator. I. Morrow
Induction motor. C. P. Steumetz
Injector. R. D. & J. C. Metcalfe
Internal combustion engine. C. Hendricks
Iron and steel. Apparatus for the manufacture of. G. J. Snelus
Iron shears. Cold. J. C. Burgess
Jails. Interlocking bar grating for. D. F. Youngblood
Joint or pivotal connection for double armed tools or appliances. H. Malignon
Knitting machine stop motion. F. S. Forry
Knob attachment. S. Fader
Knuckle pins. Stop block for broken or headless. G. Taggart
Label. G. E. Howard
Lacing hook. A. K. Lovell
Lacing hook. E. Kempshall
Lamp chimney attachment. A. T. Osborn
Lamp coil. Arc. W. H. Northall
Lamp. Gas. T. Brabson
Lamp. Incandescent gas. T. Brabson
Lamp. Incandescent hydrocarbon. G. Galkin
Lamp liquid level indicator. W. R. Jeavons
Lamp. Signal. C. H. Dressel
Lamp socket. P. H. Fielding
Lightning arrester. J. E. Cordovez
Liquid cooling boxes. Means for supporting pipe coils for. A. F. Meyer
Lister. Sulky. G. Engelmann
Lock. L. Dalton et al
Loom positive shuttle motion. F. S. Gable
Loom shuttle. E. E. Shelters
Loom shuttle motion. J. A. Gendron
Loom weft replenishing mechanism. W. H. Baker et al
Lubricating axle bearings. Means for. J. Abbot
Lubricator cup. E. L. Rampazzi
Mail box. C. H. Shuttleworth
Mail distributing case. Adjustable. H. F. W. Mohr
Mandrel or chuck. Expandable. J. H. Bryan
Measuring device. Counter. J. C. W. Meyer
Measuring instrument. Electrical. C. W. Atkinson
Metal. Treating. G. C. Carson
Metal wheels. Making. J. F. Steward
Metals from solutions containing same. Apparatus for separating. S. T. Muffy
Metals from solutions containing same. Precipitating. S. T. Muffy
Metallic tube. Flexible. C. Rudolph
Metallurgical product or alloy. J. Stevenson, Jr
Milk. Aerating and preserving. R. G. Nash
Milk cooler. W. S. Daniel et al
Mining car cage. W. Towers
Mirror. Toilet. E. M. Gover
Mixing tank. J. F. Lybrink
Moistening and closing envelopes, &c. Apparatus for. J. R. Turner
Mold. W. F. J. Lutz
Mold. A. A. Clark
Molder's flask. F. Lips
Molding machine. C. M. Day et al
Mop wringer. W. W. M. Hickey
Motor regulation. R. T. Lozier
Motor starting device. Induction. A. H. Abell
Mouse trap. R. Chasse
Muffle furnace. E. Geille
Muffler. Exhaust. W. Barber
Music chart. C. T. Meredith
Navigating or surveying instrument. J. B. Blish
Neck forming tool. E. Hoffman
Nitro compounds. Reducing aromatic. E. Wirth
Oil burner. L. A. Pfeiffer et al
Oil burner. Crude. M. A. Fesler
Oiler. Car journal. G. Armstrong
Oiling device. Automatic. G. W. Thurston
Opera chair. J. A. Wilkinson
Ore concentrator. Dry. H. M. Sutton et al
Ore conveying surface for electrical separators. H. M. Sutton et al
Ore roasting furnace. T. Edwards
Ores. Magnetically and statically treating. H. M. Sutton et al
Outlet box. E. W. Muller
Oven attachment. D. M. Wallace
Oven Bake. C. Kleinknecht
Oxalates Making. A. Wiens
Pail and cooker. Combined dinner. J. T. Bluff
Pail or package lining. J. A. McBride
Paper clip or fastener. O. Mussinan
Paper feeding or other machines. Automatic stop mechanism for. G. R. Williams
Paper maker's stuff chest. F. W. McKenney
Paper pail. (reissue). W. G. Haas
Paper pulp. Bleaching. R. C. Menzies
Paper. Toilet. W. M. Davis
Parer and corer. Fruit. G. Laws
Peat briquets. Producing. G. Hartmann
Pen. Fountain. A. T. Cross
Pen, pencil, &c., holder. C. F. Walter
Phonograph horn or megaphone. Collapsible. J. E. Storms, Jr
Phosphate and making same. J. Reese
Photographic light screen. E. F. Beckwith
Photographic printing frame. C. H. Stevens
Photographic purposes. Copyholder for. H. R. Schoonover
Piano players to pianos. Device for fastening. J. H. Chase
Pipe coupling. C. Vandall
Pipe wrench. W. H. Rowe
Planter lister attachment. I. J. Kaar
Plumbing and leveling device. P. M. Olsen
Plunger mechanism. G. T. Cooley
Pneumatic elevator and weigher. C. Bradford et al
Pole. Metallic. M. Ferguson
Polishing cylinders. Paper fastening for. F. E. Schmitt
Post cap. L. Lane
Power device. D. Lubin
Propeller shaft reversing gear. A. L. Kull

Printing press platens. Device for delivering paper to. W. G. Johnston
Protective system. A. H. Armstrong
Pulley covering machine. G. M. Birling
Pump. A. W. Weaver
Pump valves. Actuating liquid G. B. Petsche
Pump valves. Apparatus for actuating liquid G. B. Petsche
Punching bag support. H. D. Crippen
Punching bag support. G. S. Maxwell
Punching machine. J. Sadowsky
Punching tool. Hydraulic. C. Wigtel
Puzzle. G. O. Willey
Rail joint. L. F. Schodde
Rails of tramway or railway lines. Method of and means for the fixation of track. W. J. Foot
Railway safety guard. W. Morsehead
Railway signal. J. A. Guinn
Railway signaling apparatus. M. D. Moore
Railway switch. A. C. Cambridge
Railway switch. Street. S. S. Roberts et al
Railway tie. R. E. York
Railway tie. J. E. York
Railway track joints. Graduated reinforced arched angle bar for. G. H. Williams
Railways. Protector for third rails of electric. H. Brooks
Railway electric motor cooling system. 2 pats. C. O. Mailloux et al
Range. Cooking. H. J. Mathias
Range finder. C. A. Trotter
Rapid transit line. Elevated. I. H. Fincham
Ratchet drill. H. & M. Bennische
Ratchet wrench. F. F. Landis
Razor guard. E. Schreiber et al
Razor stopping machine. W. Tapp
Regenerative system. A. G. Davis
Regenerative system. M. T. A. Kubierschky
Rein guide. H. N. Martin
Rolling, wrapping, or winding machine. J. Canning
Rolling mill. H. L. Thompson
Rolls. Mold for making French. B. Ycre
Rotary engine. J. W. Larimore
Rotary engine. 2 pats. J. F. Williams
Rotary engine. 2 pats. S. J. Johnson
Ruler attachment. S. Schaller
Ruling edges. Parallel motion for. R. Marx
Ruling machine. E. Graber
Sample and ticket holder. Dry goods. C. H. Smith et al
Sand paper holder. A. Shurick
Sash holder. H. Flanders
Sash lock. Automatic. S. G. Wellman
Saw. Railway cut off. B. G. Luther
Sawmill set works. J. Walton
Scaffold. Paper hanging. W. H. Root
Scale. Measuring. H. Giles
Scale. Platform. S. J. Austin
Sealing preserving jars. Means for. W. Walter
Separator. C. W. A. Koelbeck
Sewing machine. Book. F. D. Taylor
Sewing machine. Buttonhole. C. A. Dahl et al
Shade cord fastener. G. G. Going
Shade rollers. Mounting for vertically adjustable. A. A. Pease
Shaft or pole coupling. Vehicle. J. Hearne
Shafting. Means for attaching collars or pulleys to. D. L. Potter
Sheet metal handle. H. A. Keiner
Shelving. J. M. Lippincott
Ship coaling apparatus. F. V. Matton
Shoe. E. J. Bliss
Shoe fastening device. W. Becker
Shoulder brace and suspenders. Combined. A. N. Johnson
Shovel clip. Sheet metal. H. G. Sawyer
Sign illuminated by electric current. E. Plancon
Signal system. Train. A. G. Davis
Siphon filling apparatus. L. Gansz
Slag. Making basic. J. Reese
Sled. Bob. J. H. Anderson
Sleigh attachment. Bob. R. McArthur
Smoke conductor. D. L. Potter
Smoke consuming apparatus. Furnace. A. Anderson
Sounds. Recording and reproducing. T. H. Macdonald
Spectacles. F. Schick
Spike puller. G. Smith
Spoke chipping machine. R. L. Notman
Sponge. Protected. J. Williams
Spout and faucet. A. J. Ketelsen
Spring. M. H. Naber
Stacker fan. Pneumatic. 2 pats. J. K. Sharpe, Jr
Stamp affixer. J. R. Turner
Stamping or punching tool. W. Neuendorf
Stay. Garment. R. Herzog
Steam boiler. C. M. Raymond
Steam boiler. Water tube. P. J. Sweeney
Steam generator. J. T. Plenty
Steam trap. D. Murdock
Steel. High tungsten. G. B. Brown
Stiffening strips. Substitute for whalebone. A. M. Weber
Still. E. Warren et al
Storage battery. S. Laszcznski
Stove. Open fireplace. J. K. Ross
Stovepipe. J. Wylie
Strength testing machine. H. Haenze
Switch operating device. O. McNorton, Jr
Sword. Trick. W. Thomas
Tank cover. A. Giesler
Tanning hides, pelts, &c. Solution for. O. P. Amend
Tap hole plug. A. Dickey
Telegraphers' keys, &c. Button for. H. J. Greule
Telegraphic messages over a single wire. Apparatus for simultaneously transmitting a number of. J. Ziegler
Telegraphic or telautographic apparatus. E. K. Gruhn
Telegraphy. Wireless. 2 pats. H. Shoemaker
Telephone switch. J. A. Warrick
Telephones, telegraphs, &c. Traveling contact for railway. A. D. Jones
Thill coupling. R. Eccles
Thill coupling. W. A. Buchanan
Ticket issuing, recording, and printing machine. W. I. Ohmer et al
Time sheet. O. Johnson
Tire and rim. Vehicle. F. G. Saylor
Tire. Pneumatic. W. Edmund
Tires. Means for tightening wires in elastic. J. E. Sprague
Toilet article handle. R. R. Debacher

Tongs. Pipe. W. Maxwell
Tongue attachment. R. C. Thompson
Tool handle. Motor. G. H. Hillyer
Toy. Spirometer. H. G. Cady
Tramway lines. Mechanism for shifting points of. G. D. Ross
Tramway switch. Automatic. J. Hilmar
Transformer, inductor, &c. F. Pichler
Trap. E. M. Nichols
Treenail billets, &c. Machine for turning. A. Collet
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Trolley guard. C. O. Prince
Trolley harp contact. J. H. Walker
Trolley pole harp. J. H. Walker
Trolley wheel. J. B. Lockerby
Trowel. Plasterer's. F. T. McFall
Truck. Hand. E. J. Bryan
Truss. Hernial. G. R. House
Tufting machine. J. C. Borgwardt et al
Tunnel construction. G. Lindenthal
Tunnels. Laying. G. Lindenthal
Turbine. Steam. R. Wilson
Type for type writing or printing. B. P. Tchekassov et al
Type writer. C. Spiro
Type writing machine. H. Jarvis
Type writing machine attachment. W. C. Black
Type writing machine spacing mechanism. L. Schlesinger et al
Universal joint. R. W. Pittman
Universal union or coupling. G. S. Lee
Valve. Air compressor relief. C. H. Stanton et al
Valve. Air compressor relief. A. Giesler
Valve and packing. Plunger. T. Grant
Valve. Combined vacuum relief. E. B. Whelan et al
Valve gear. Fluid pressure engine. J. T. Marshall
Valve. Pressure reducing. S. Carlson
Vapors. Apparatus for disposing of foul. E. R. Edson
Vehicle. Drop body. A. P. Bowman
Vehicle speed regulating mechanism. Motor. S. Scognamiglio et al
Vehicle spring. E. F. Gehman
Vehicle stop spring padding. R. A. Keller
Vehicle wheel. J. M. Alderfer
Vending machine. E. Shaw
Vessel support. A. P. Hallock
Veterinary speculum. R. J. Fleming

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Wage statement and pay envelop. Employee's. J. T. Dixon
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Wagon. Dump. 3 pats. J. W. Haywood
Wagon. Dumping. J. B. Rhodes
Wagon. Dumping. J. F. Day
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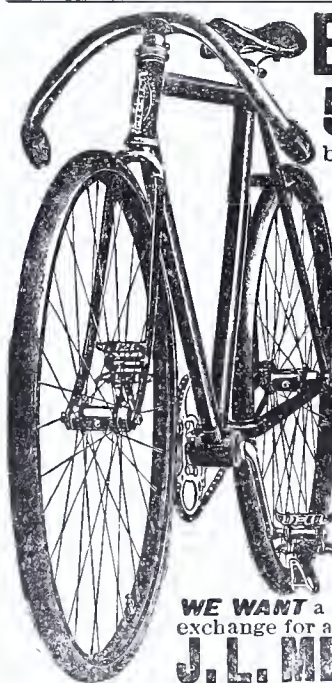
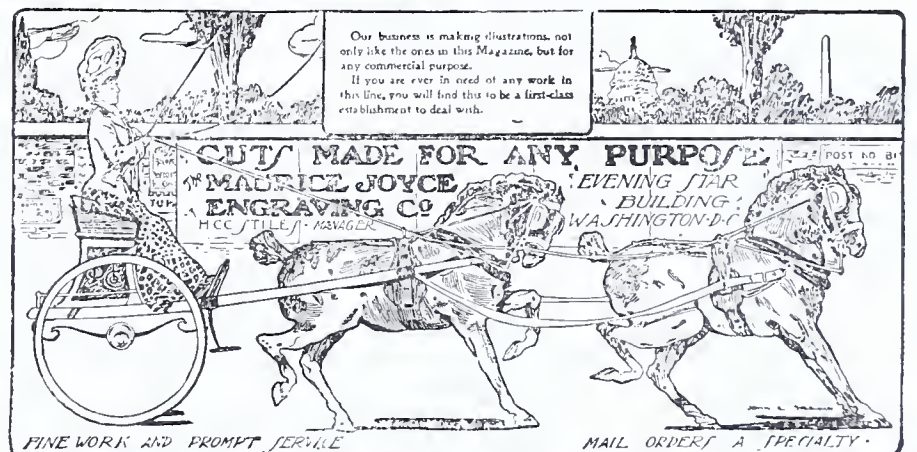
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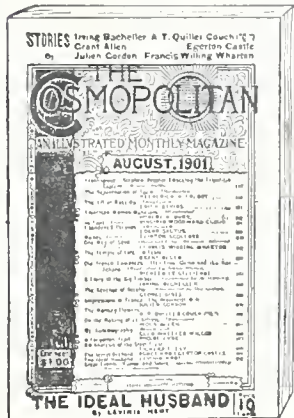
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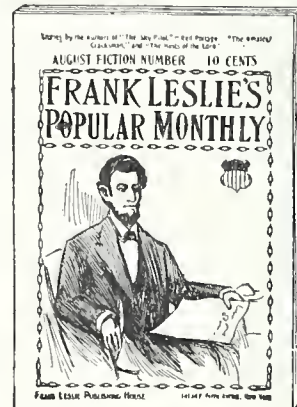
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